

& GETAL & RUIMTE



Noordhoff

NAAM

KLAS

Getal & Ruimte

Werkboek

4 vmbo-kgt deel 1

Twaalfde editie, 2021

Noordhoff
Groningen

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1 Statistiek en kans

Voorkennis Procenten

1 BEZOEKERS PRETPARK

blz 8

%	100	1	23,5
aantal	22 375	\times	?

3 BEZOEKERS MET ABONNEMENT

blz 8

%	100	\times	?
aantal	16 372	1	3185

4

blz 8

oude prijs	prijsverhoging	prijsverhoging in %	nieuwe prijs
€485	€38		
€1294	€97,85		
€16378	€694		
€178432		2,3%	

5 TOENAME BEZOEKERS KASTEEL

blz 9

%	100	$\times 100$	1	$: 7,6$	7,6
aantal	?	$\times 100$	\times	$: 7,6$	65 000

1.1 Grafen

Test
opgave

Zutphen

blz 12

		naar				
van	afstand	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>
	<i>A</i>					
	<i>B</i>					
	<i>C</i>					
	<i>D</i>					
	<i>E</i>					

3

blz 12

		naar				
van	afstand	Efde	Fran	Gees	Harle	Kruin
	Efde					
	Fran					
	Gees					
	Harle					
	Kruin					

4

blz 13

		naar				
van	afstand	Andel	Bro	Cars	Doeri	Ees
	Andel					
	Bro					
	Cars					
	Doeri					
	Ees					

5

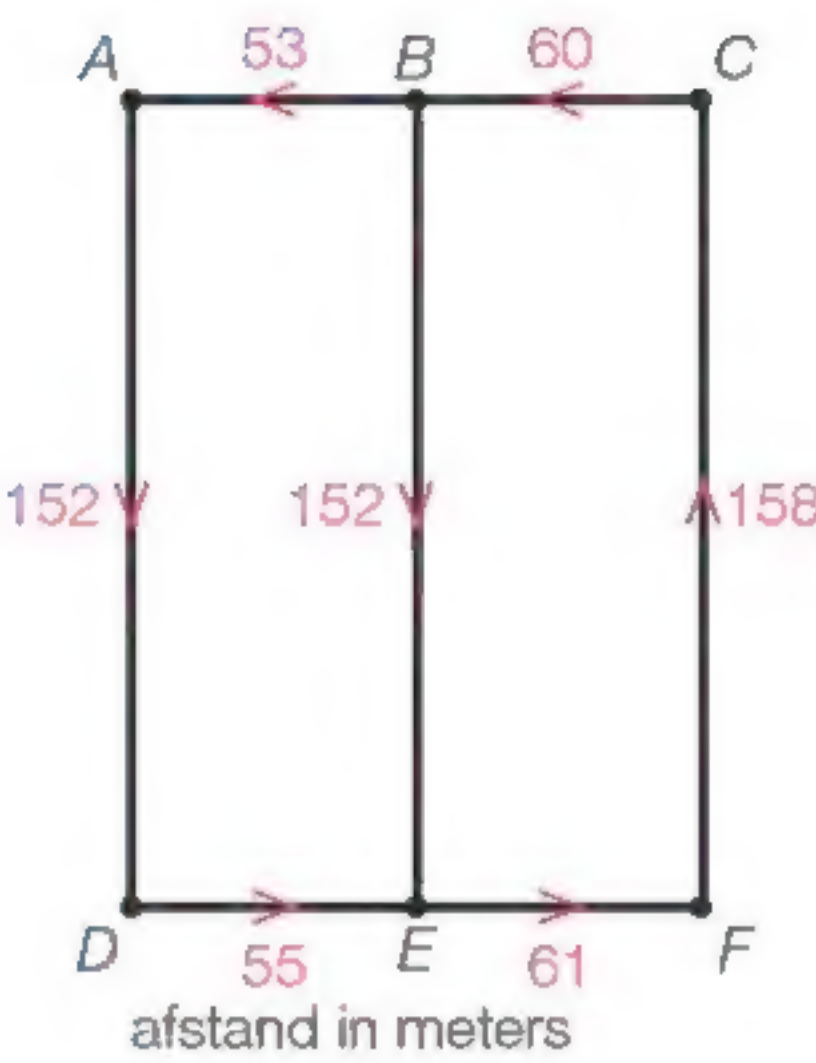
blz 13

		naar				
van	afstand	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>
	<i>A</i>					
	<i>B</i>					
	<i>C</i>					
	<i>D</i>					
	<i>E</i>					

6

blz 14

		naar					
van	afstand	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
	<i>A</i>						
	<i>B</i>						
	<i>C</i>						
	<i>D</i>						
	<i>E</i>						
	<i>F</i>						



7

blz 14

		naar					
van	afstand	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
	<i>A</i>						
	<i>B</i>						
	<i>C</i>						
	<i>D</i>						
	<i>E</i>						
	<i>F</i>						

1.2 Telproblemen

31

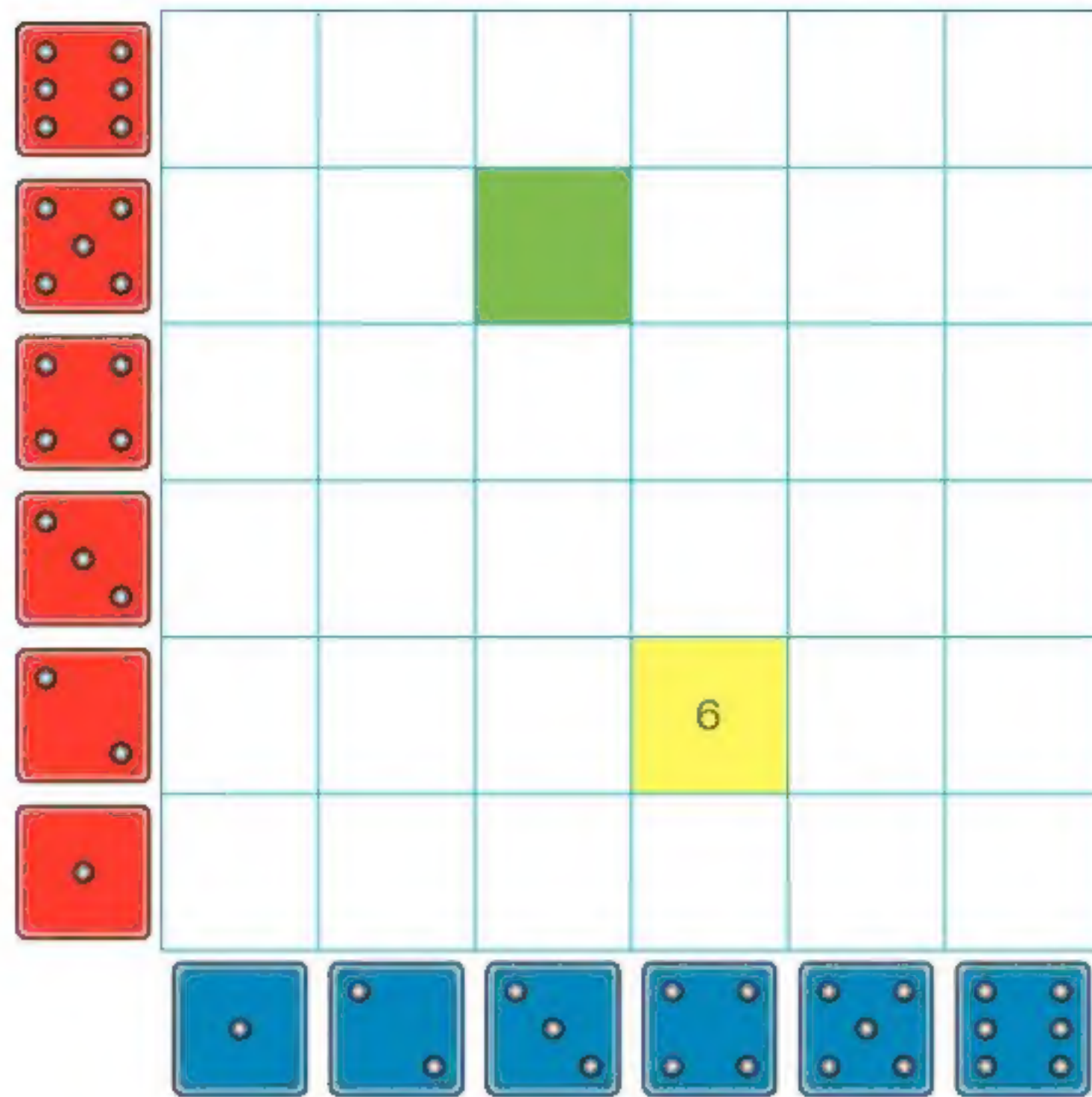
blz 29

1e ronde	2e ronde	3e ronde	4e ronde
16 spelers	... spelers	... spelers	... spelers
... wedstrijd(en)	... wedstrijd(en)	... wedstrijd(en)	... wedstrijd(en)

1.3 Kans

43

blz 34



44

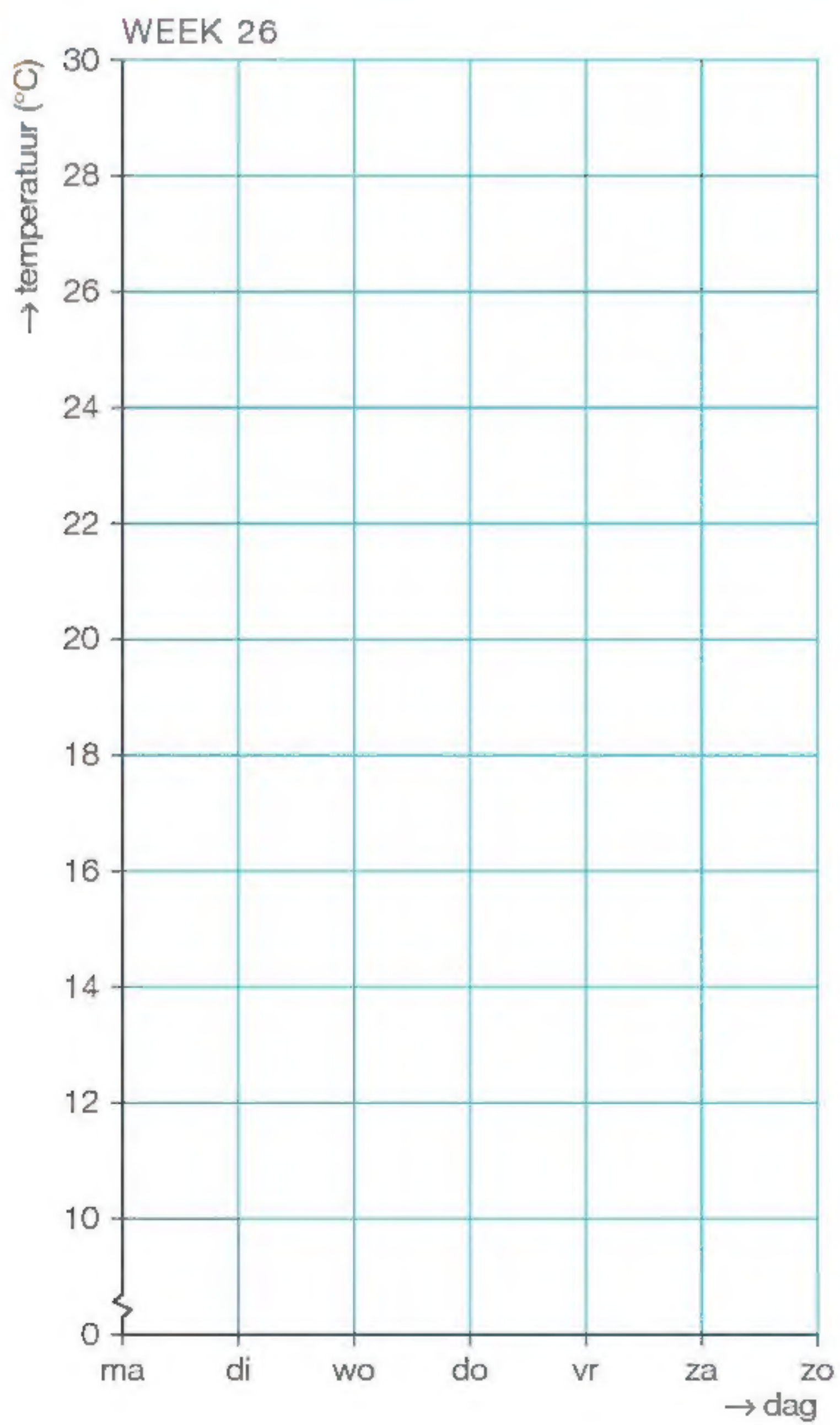
blz 34

%	100	?
aantal	36	

1.4 Diagrammen tekenen

56

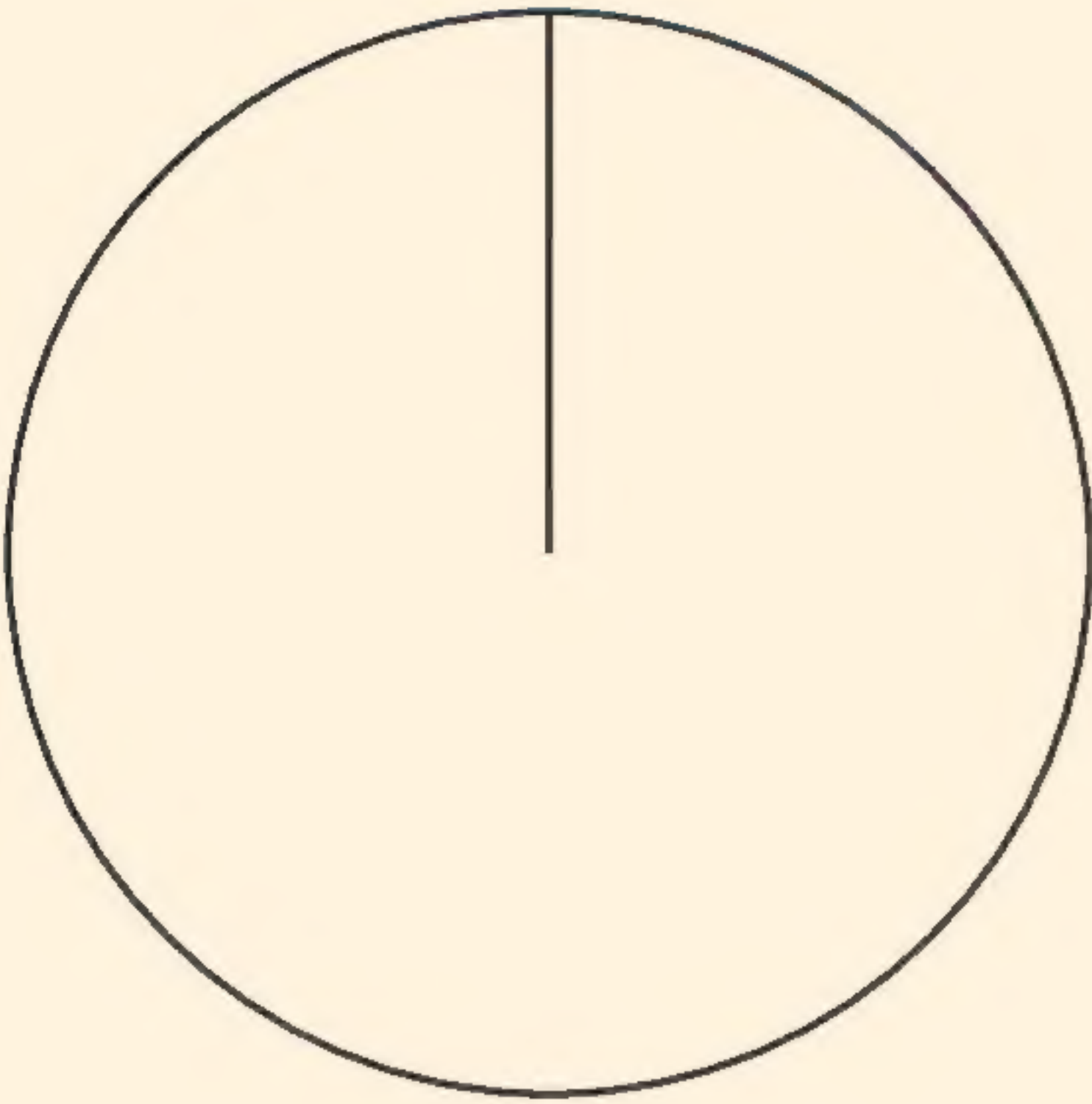
blz 39



Scooter

kleur	rood	blauw	wit	zwart	grijs	totaal
aantal	28	15	17	35	25	
percentage						
hoek						

x 3.6

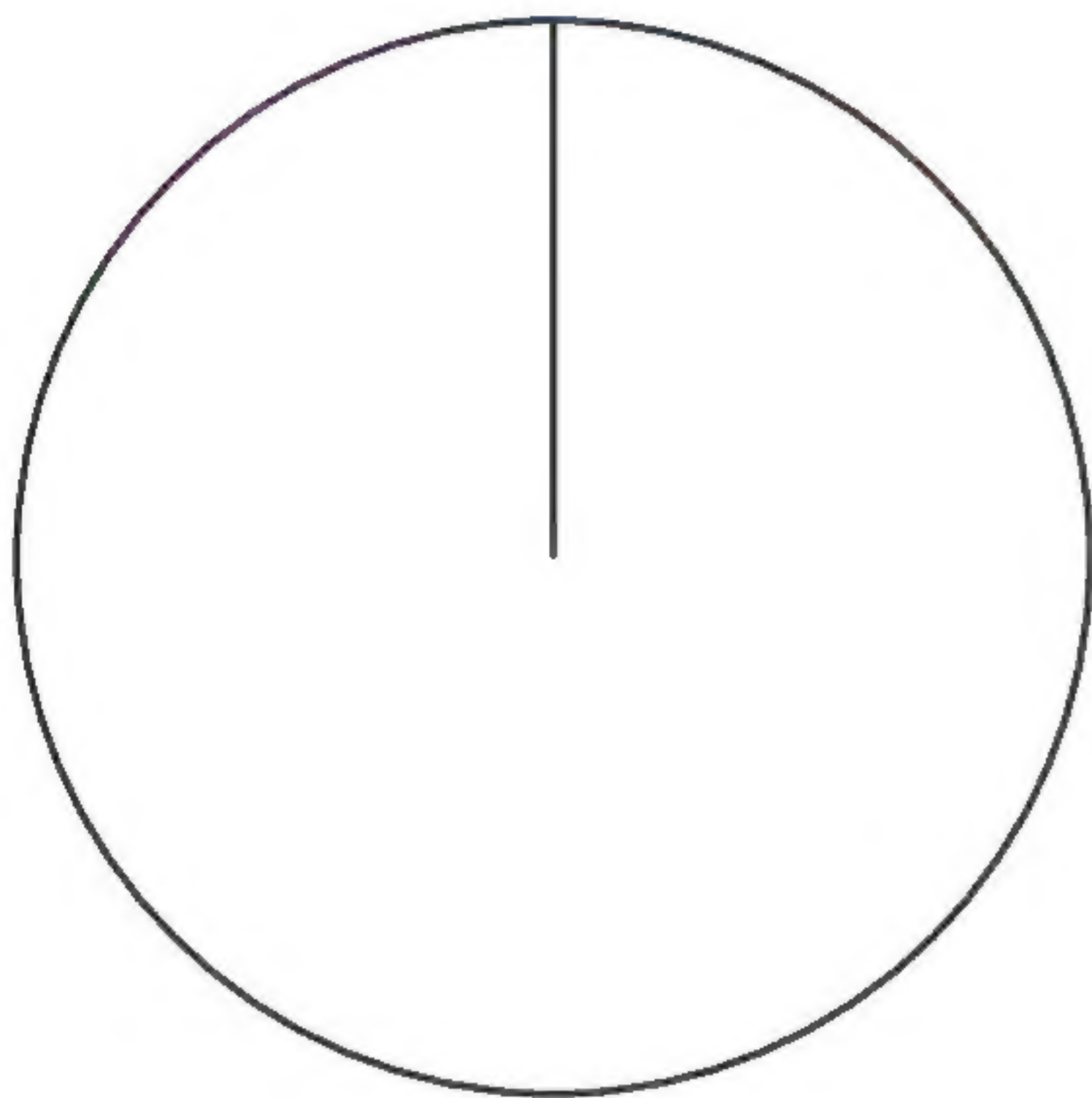


soort	cola	sinas	appelsap	jus d'orange	koffie	thee	totaal
aantal	145	92	87	230	104	142	800
percentage							100%
hoek							360°

× 3.6

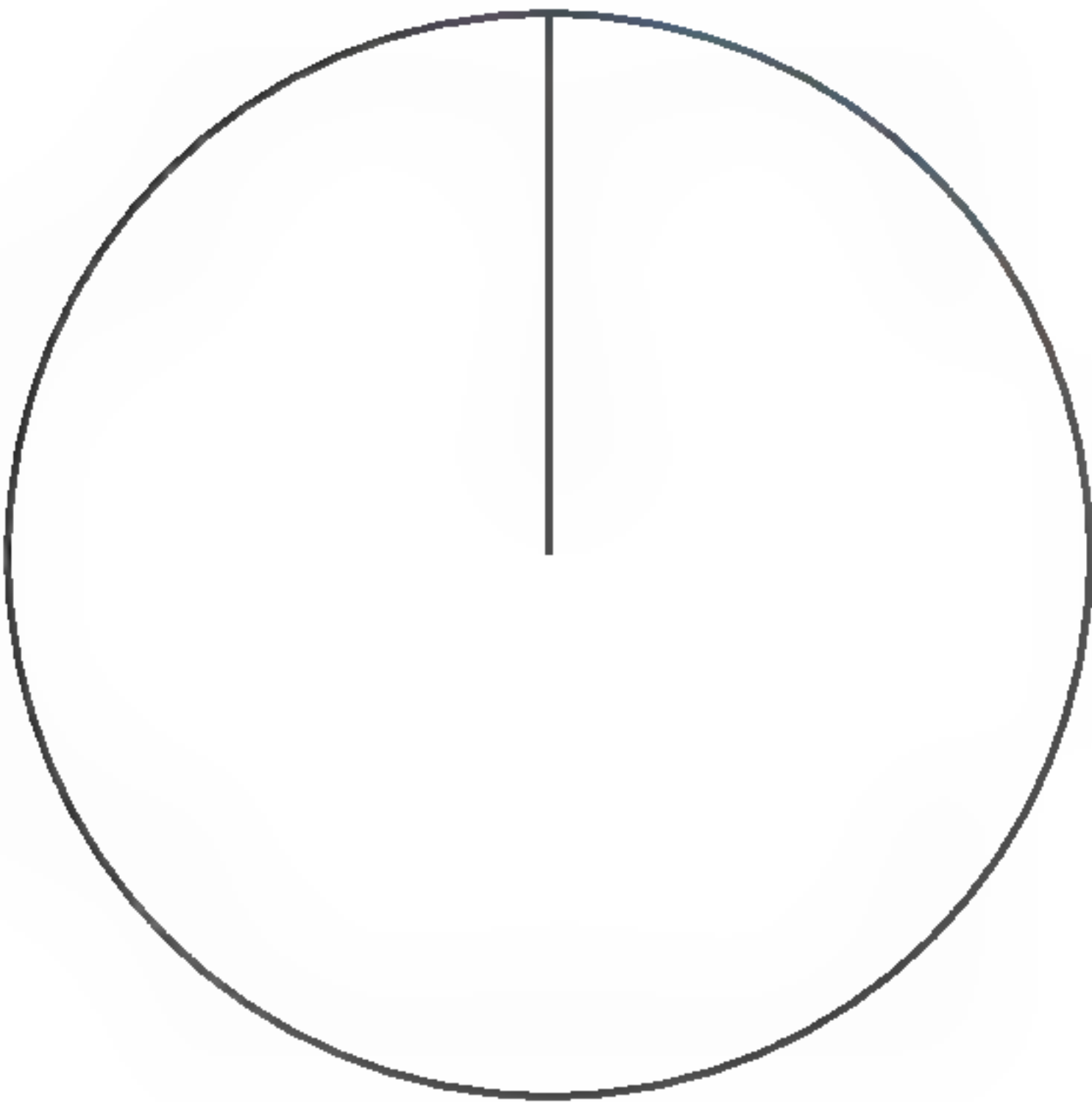
%	100	×	?
aantal	800	1	145

$\frac{100}{800} \times 145 = ?$
 $\frac{1}{800} \times 145 = ?$



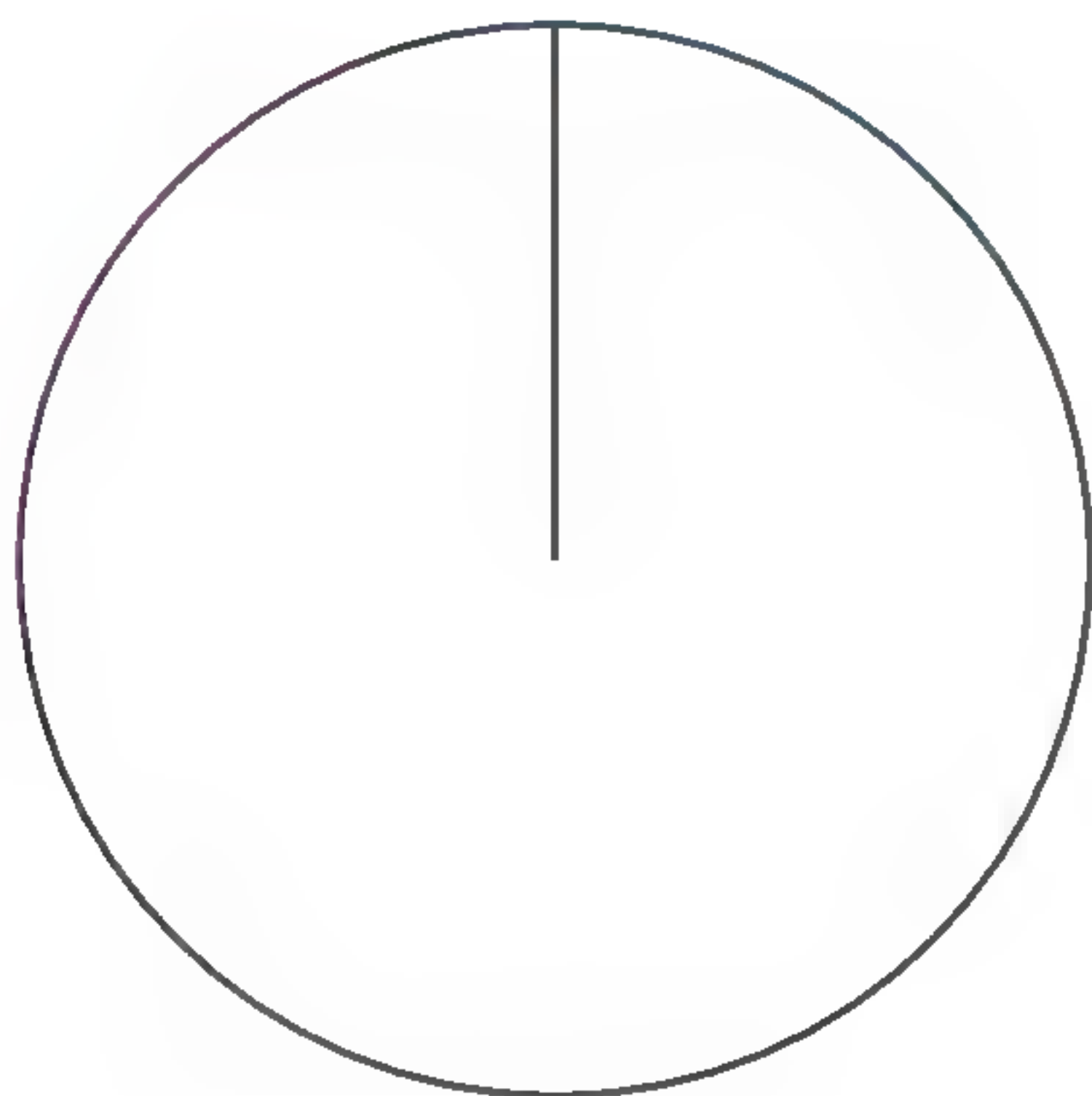
bezigheid	slapen	school	eten	ontspanning	huiswerk	totaal
aantal uren	8	6	2	6	2	
percentage						
hoek						

× 3.6



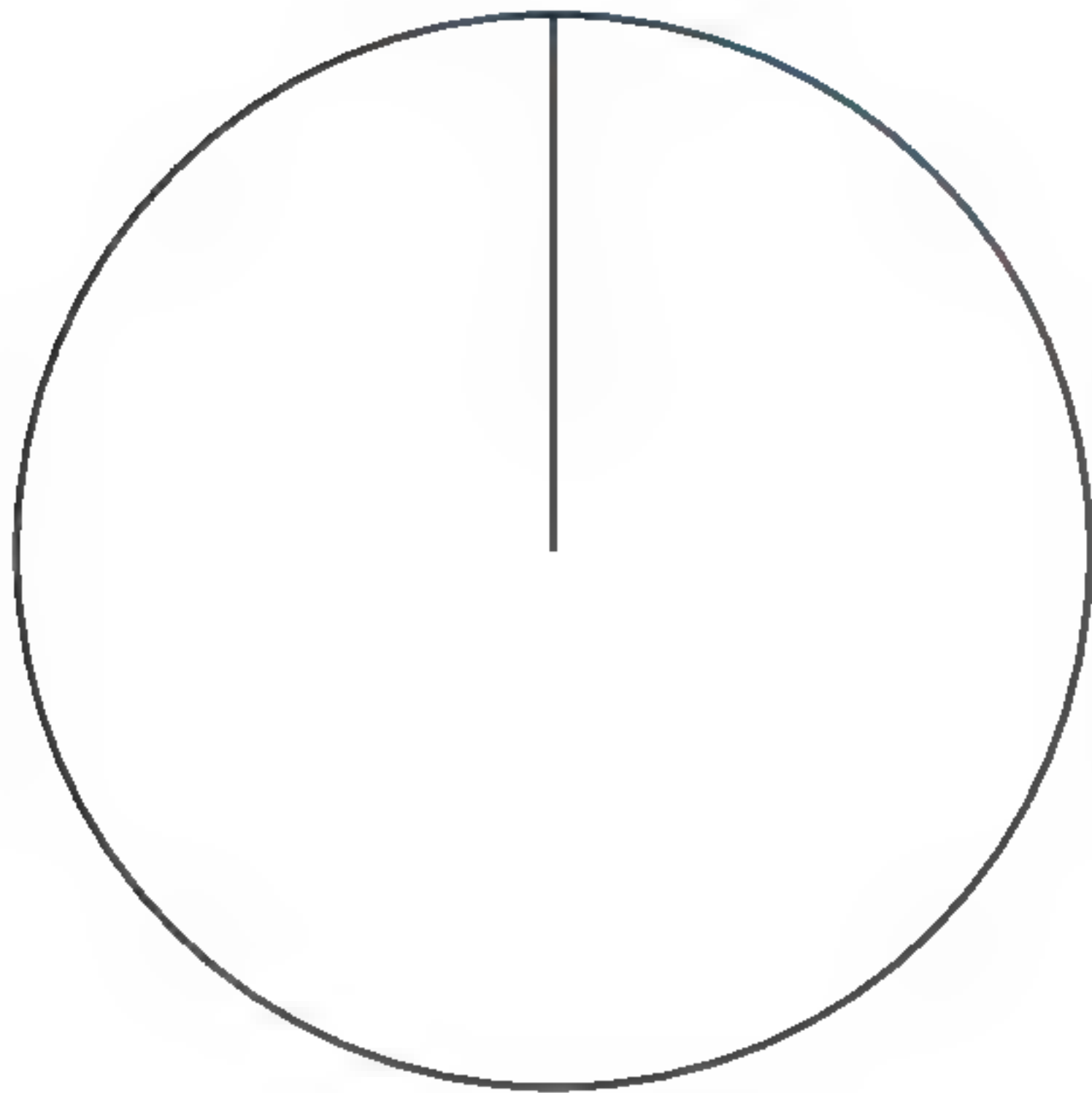
kleur	wit	rood	grijs	zwart	blauw	totaal
aantal	30	15	118	93	12	
percentage						
hoek						

$\times 3.6$



profiel	landbouw	zorg en welzijn	economie	techniek	totaal
aantal leerlingen	16284	32274	33933	32274	
percentage					
hoek					

) x 3.6



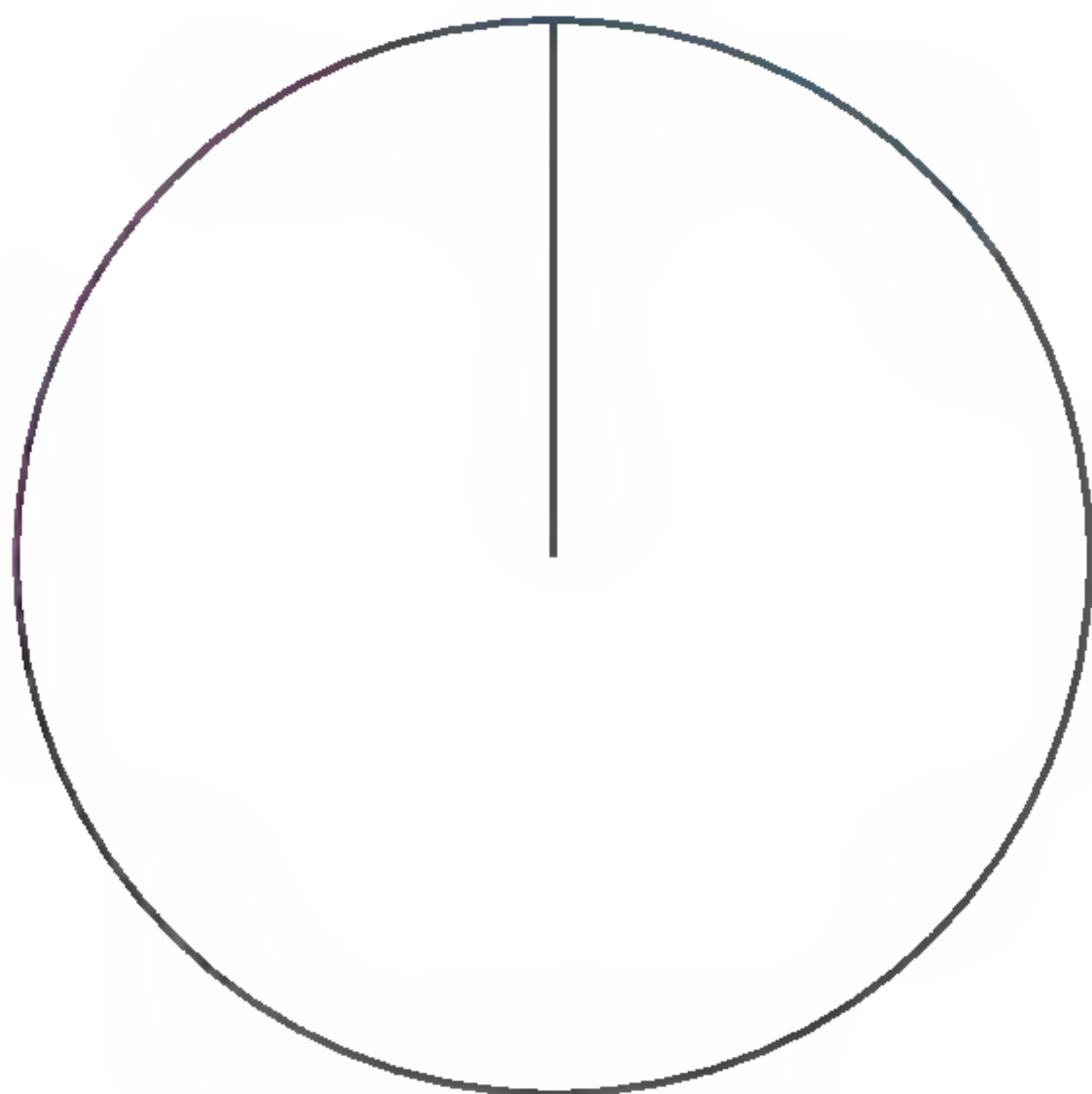


blz 45

DAGINDELING ELINE

bezigheid	slapen	ontspanning	school	huiswerk	eten	totaal
tijd	8:30	4:45	7:15	1:30	2:00	
percentage						
hoek						

$\times 3.6$



1.5 Steelbladdiagram en boxplot maken

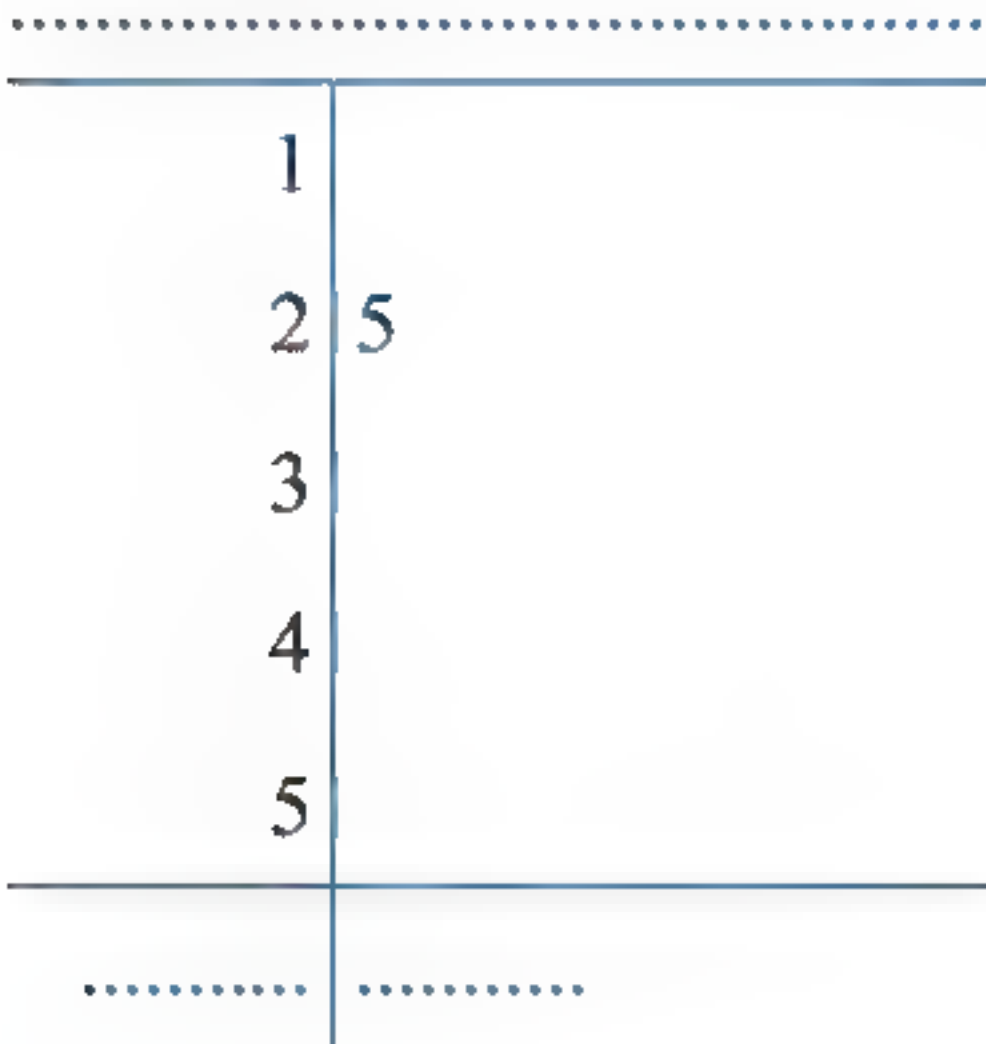


blz 48

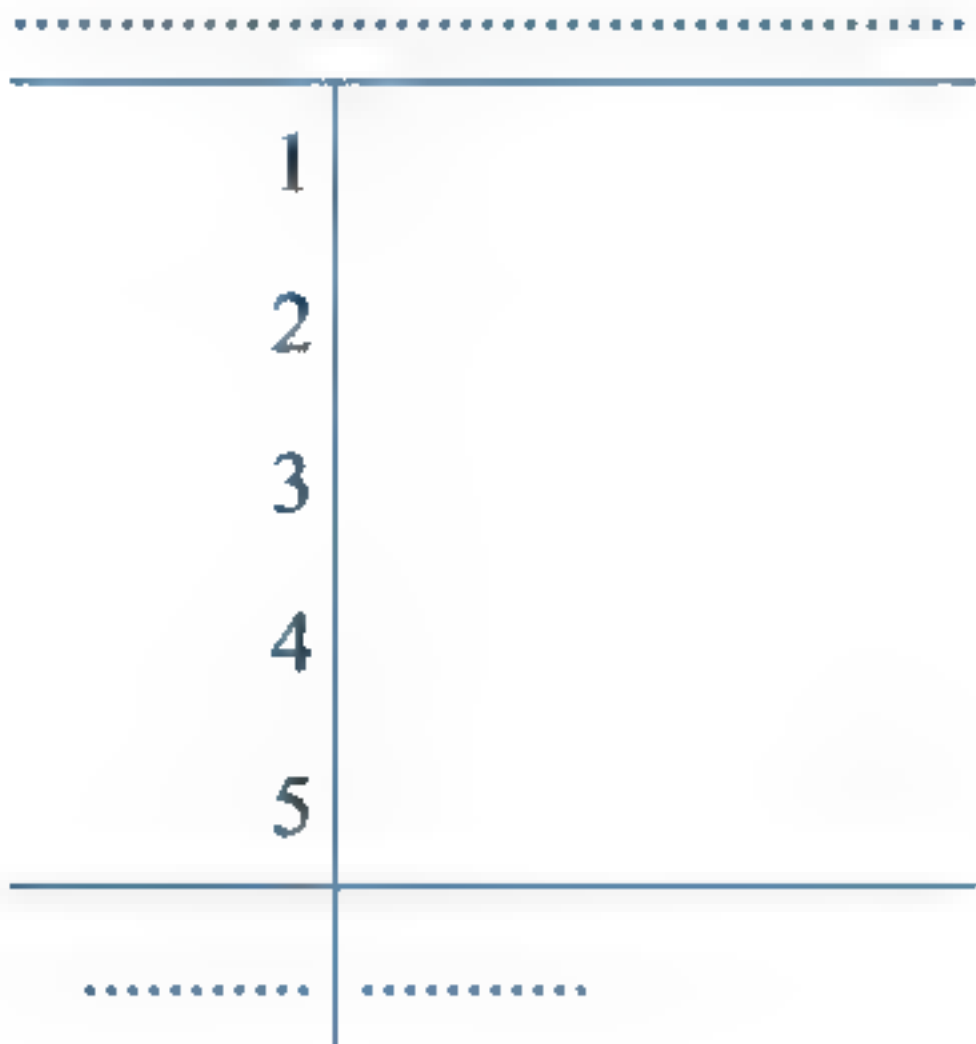
TIJDSDUUR WEDSTRIJD

25	39	22	45	36	32	44	23
36	43	17	51	28	53	36	28

Klad



Net



D-toets

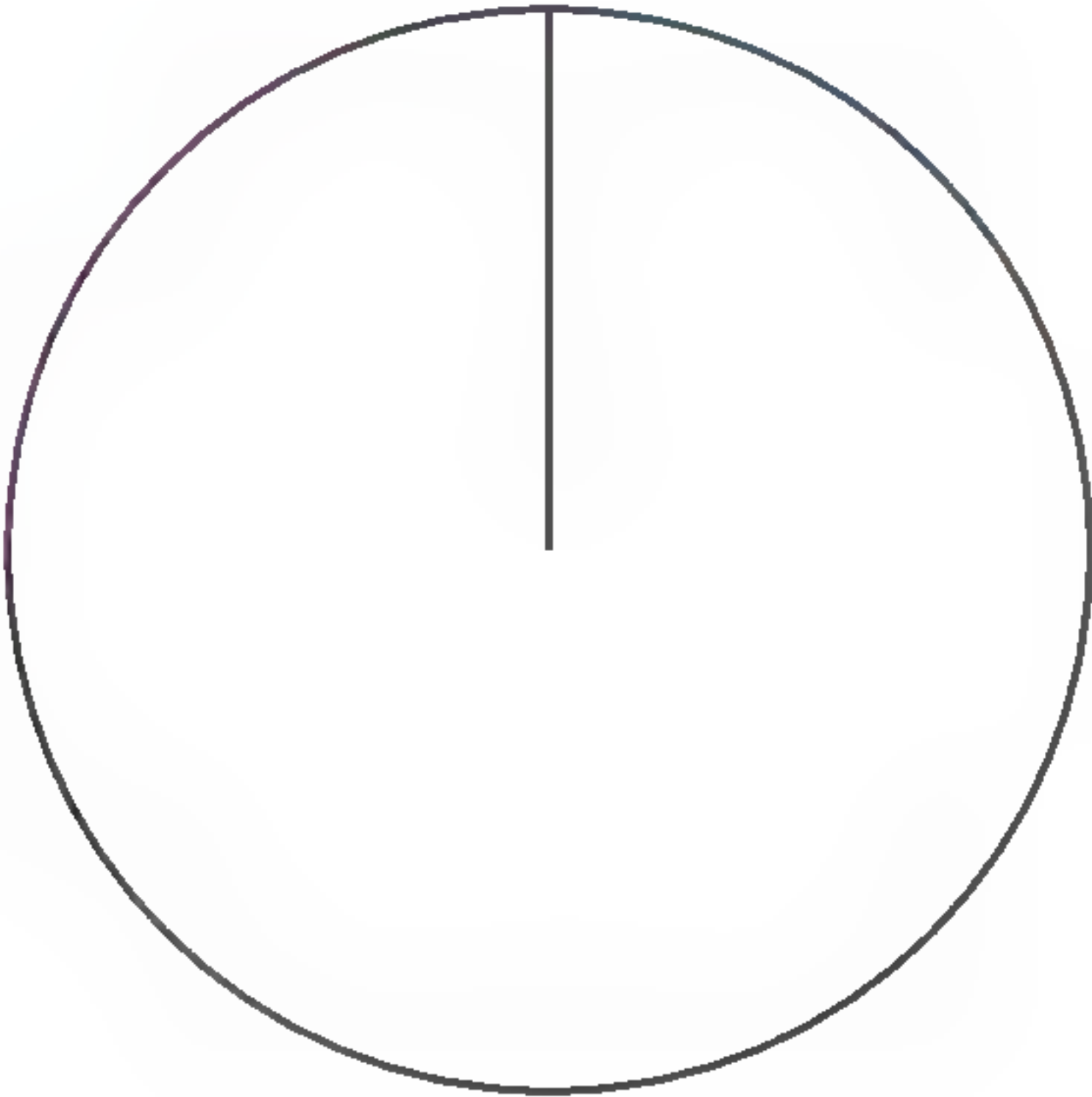


blz 60

		naar				
		<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>
van	<i>P</i>					
	<i>Q</i>					
	<i>R</i>					
	<i>S</i>					
	<i>T</i>					

onderwijssoort	vmbo-B	vmbo-K	vmbo-GT	havo	vwo	totaal
aantal	285	314	427	428	346	
percentage						
hoek						

× 36



2 Verbanden

Voorkennis Volgorde van bewerkingen

4 horizontaal

blz 66

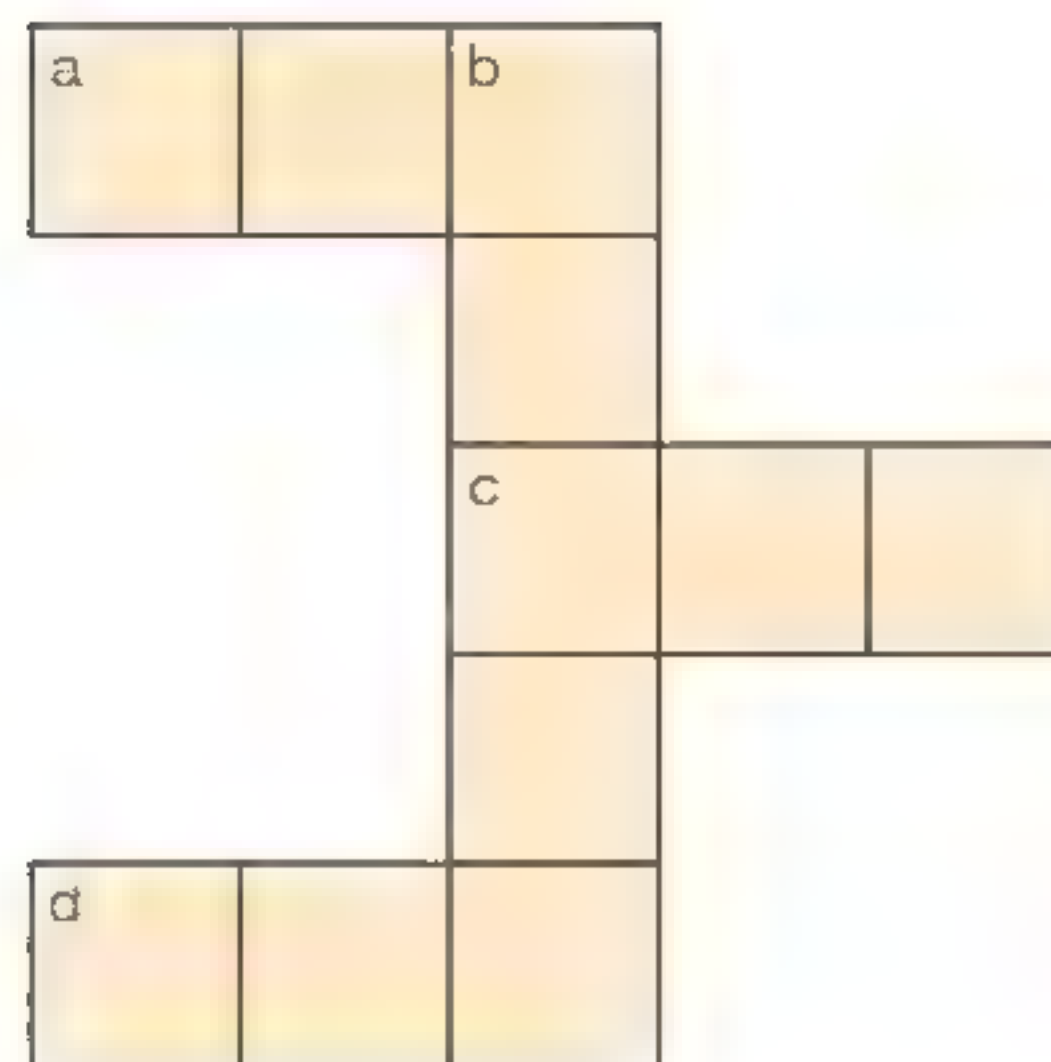
a $10^2 + 9^2$

c $(5^2 - 4^2) \times 11 + \sqrt{64}$

d $(\sqrt{81} + \sqrt{100}) \times (\sqrt{400} - 10)$

verticaal

b $10^4 + \sqrt{100 + 125} \times 10$



2.1 Machtsverbanden

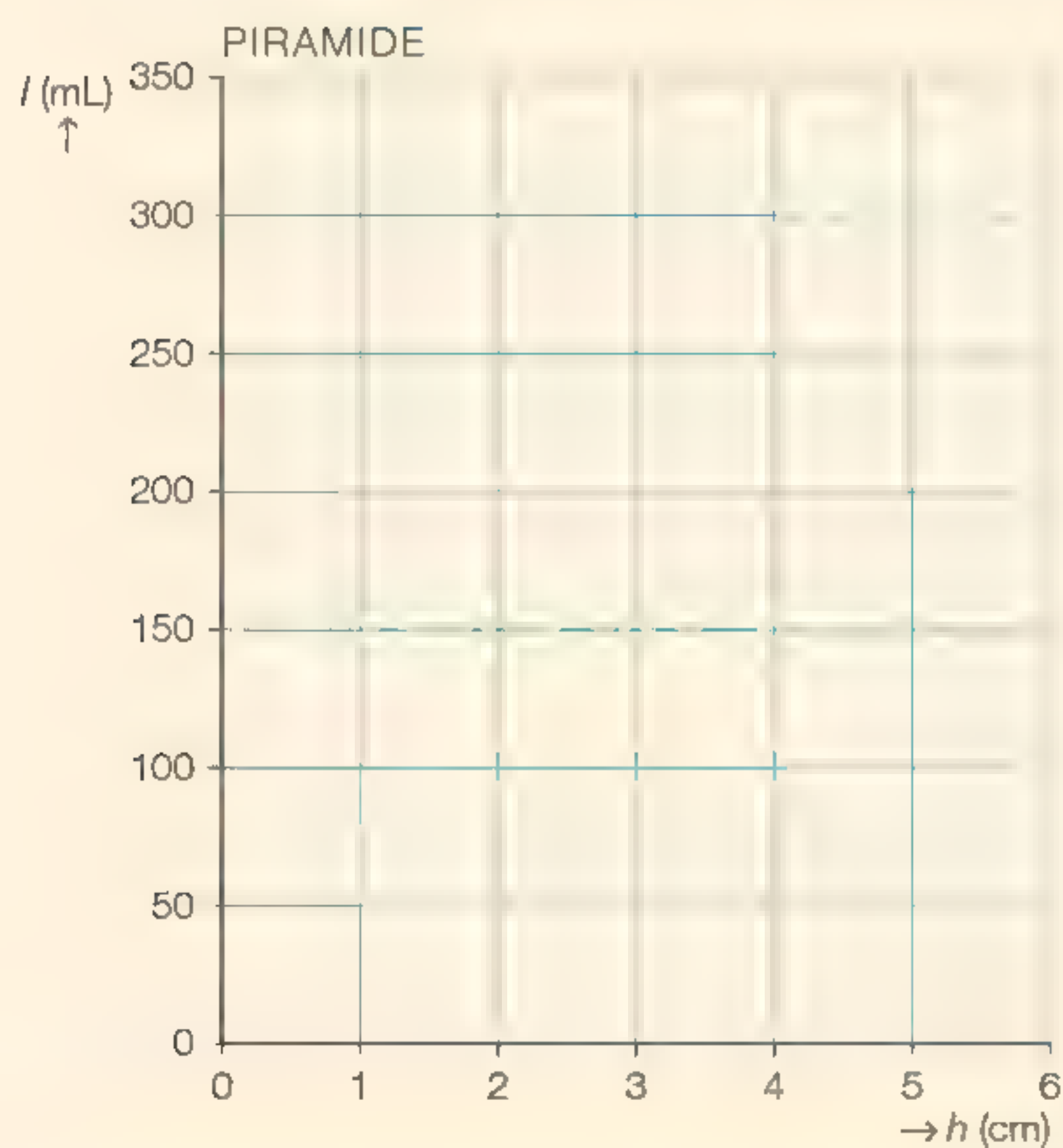


Piramide

blz 70

PIRAMIDE

h (cm)	1	2	3	4	5	6
I (mL)						

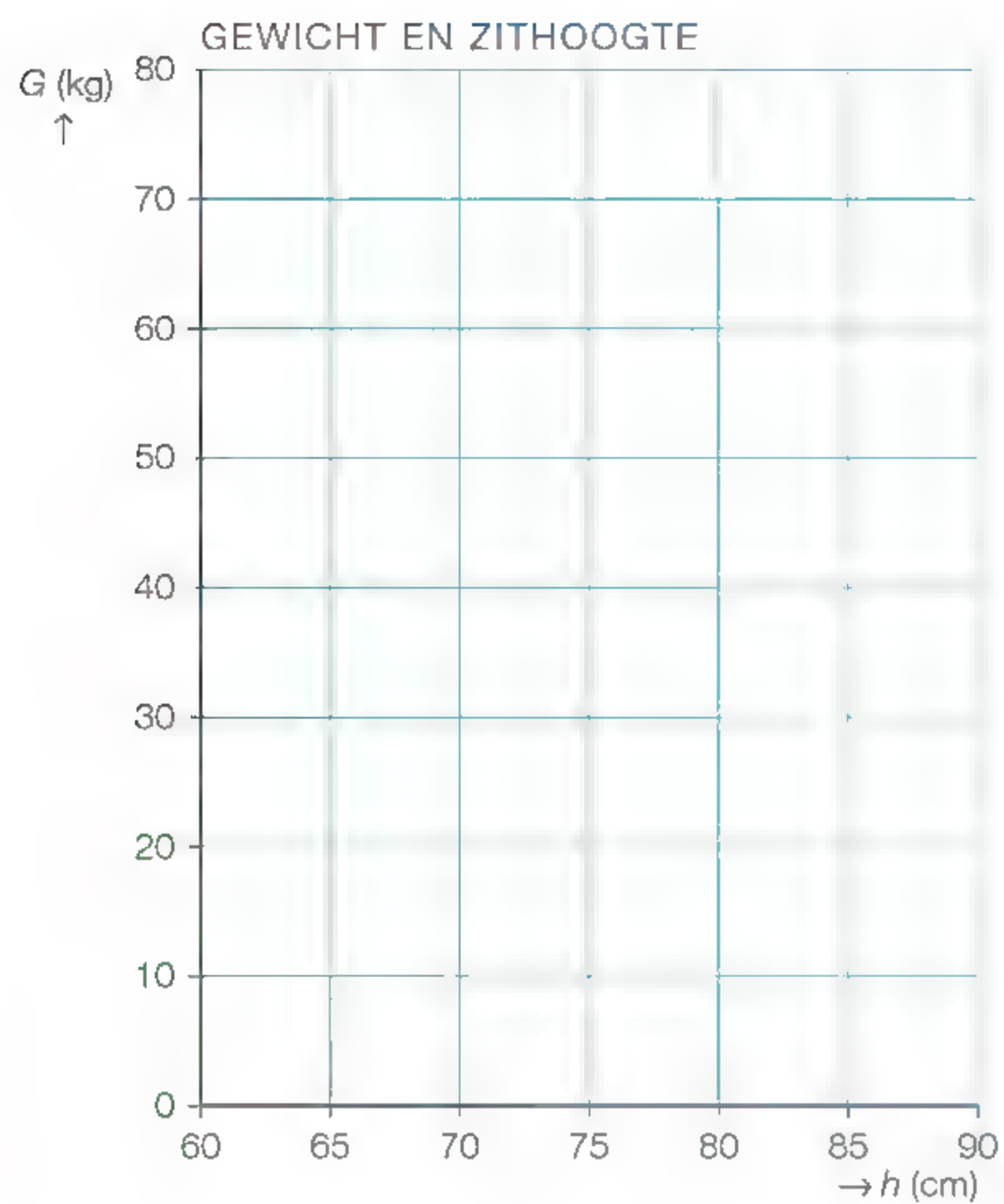




blz 70

GEWICHT EN ZITHOOGTE

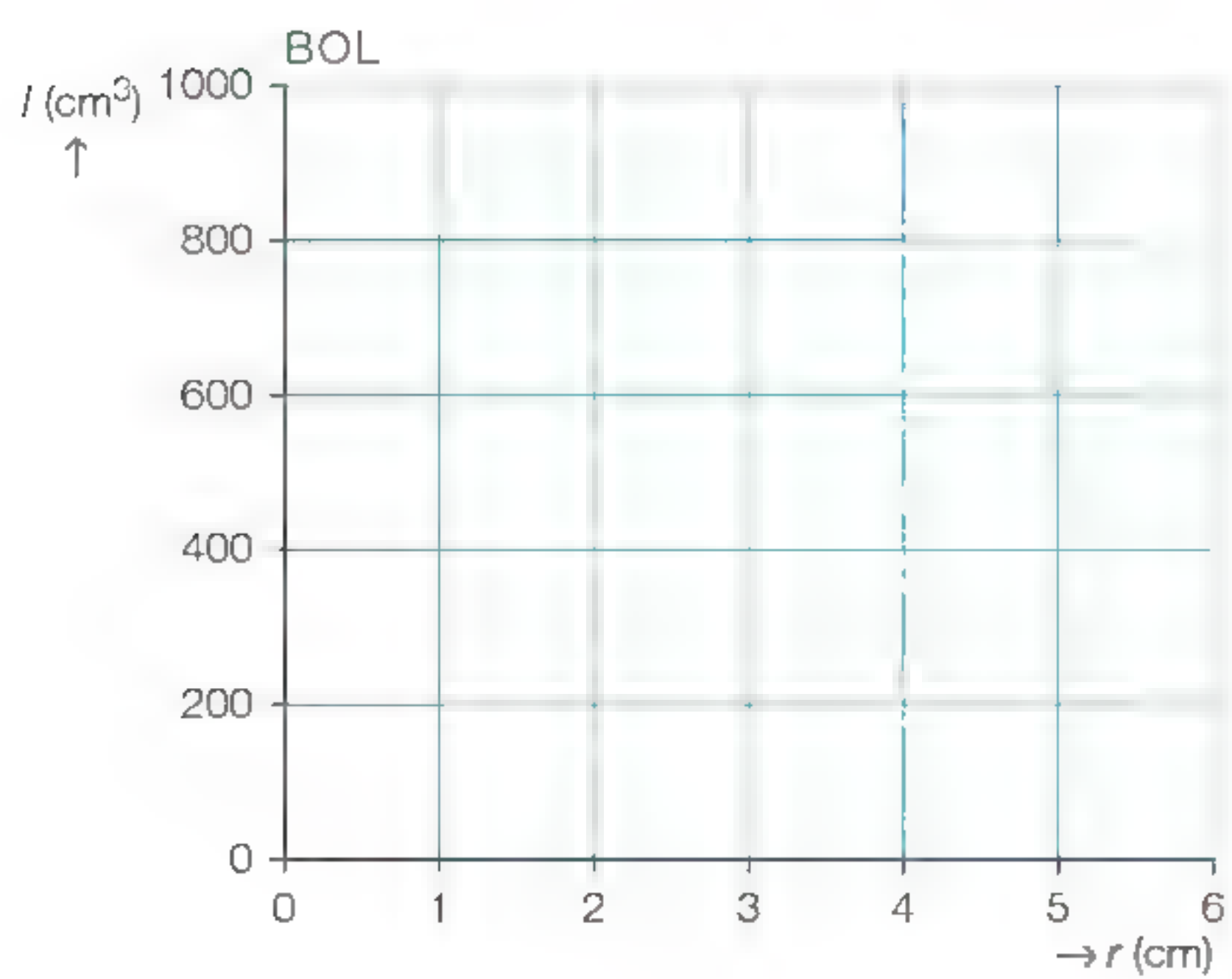
h (cm)	60	65	70	75	80	85	90
G (kg)							



blz 71

BOL

r (cm)	0	1	2	3	4	5	6
I (cm ³)						524	

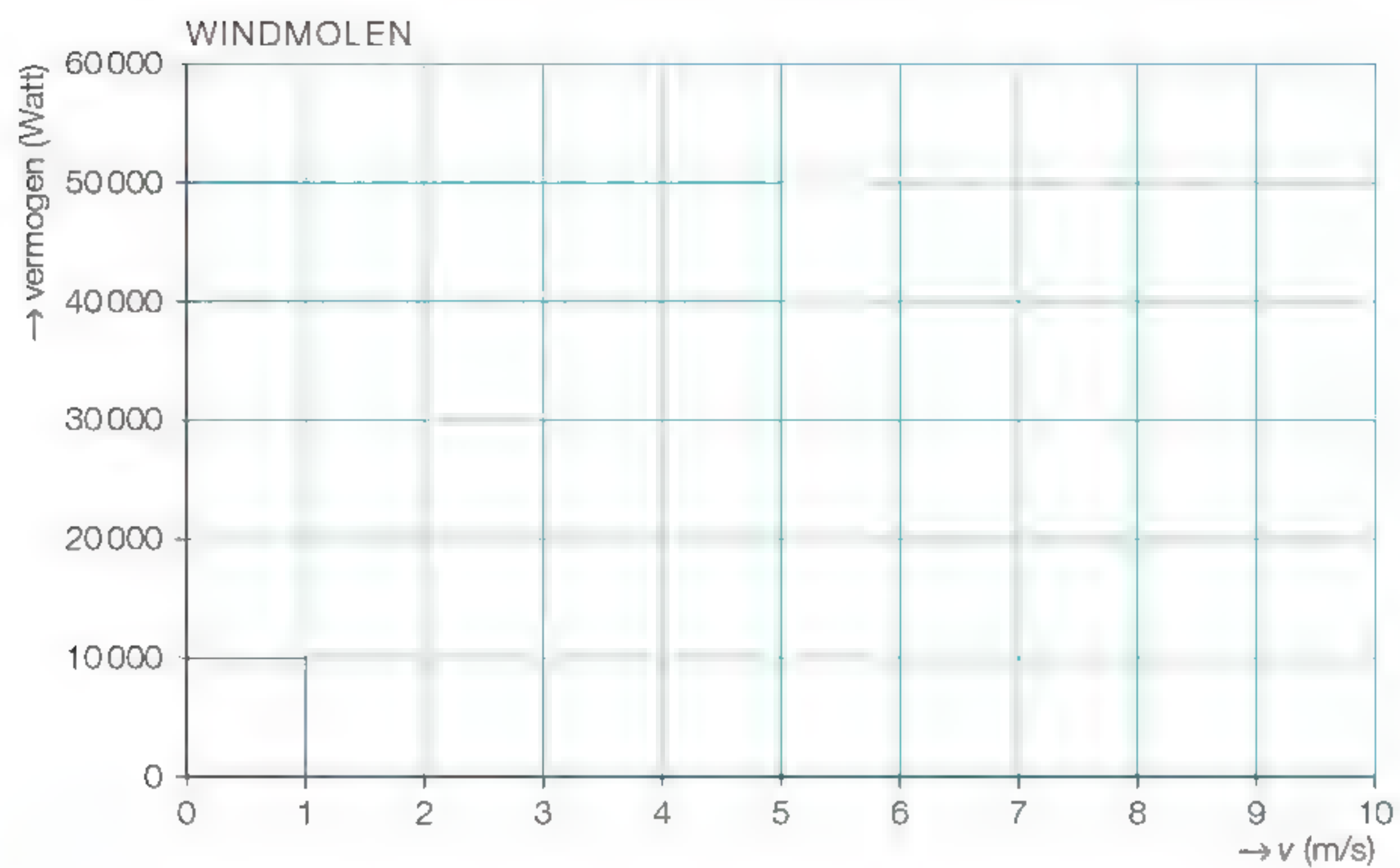




blz 71

WINDMOLEN

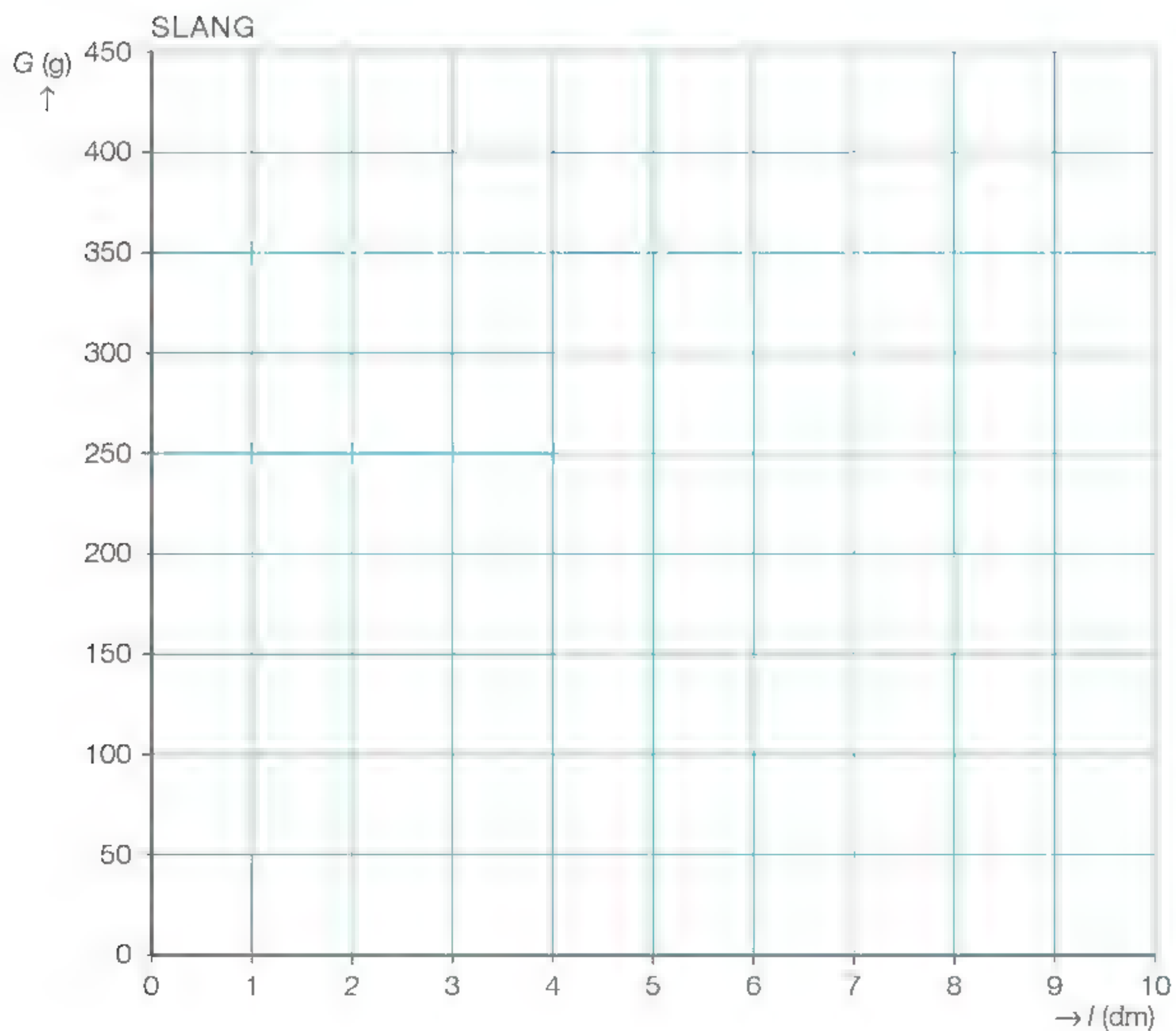
v (m/s)	0	2	4	6	8	10
vermogen (Watt)						



blz 72

SLANG

l (dm)	0	2	4	6	8	10
G (g)						

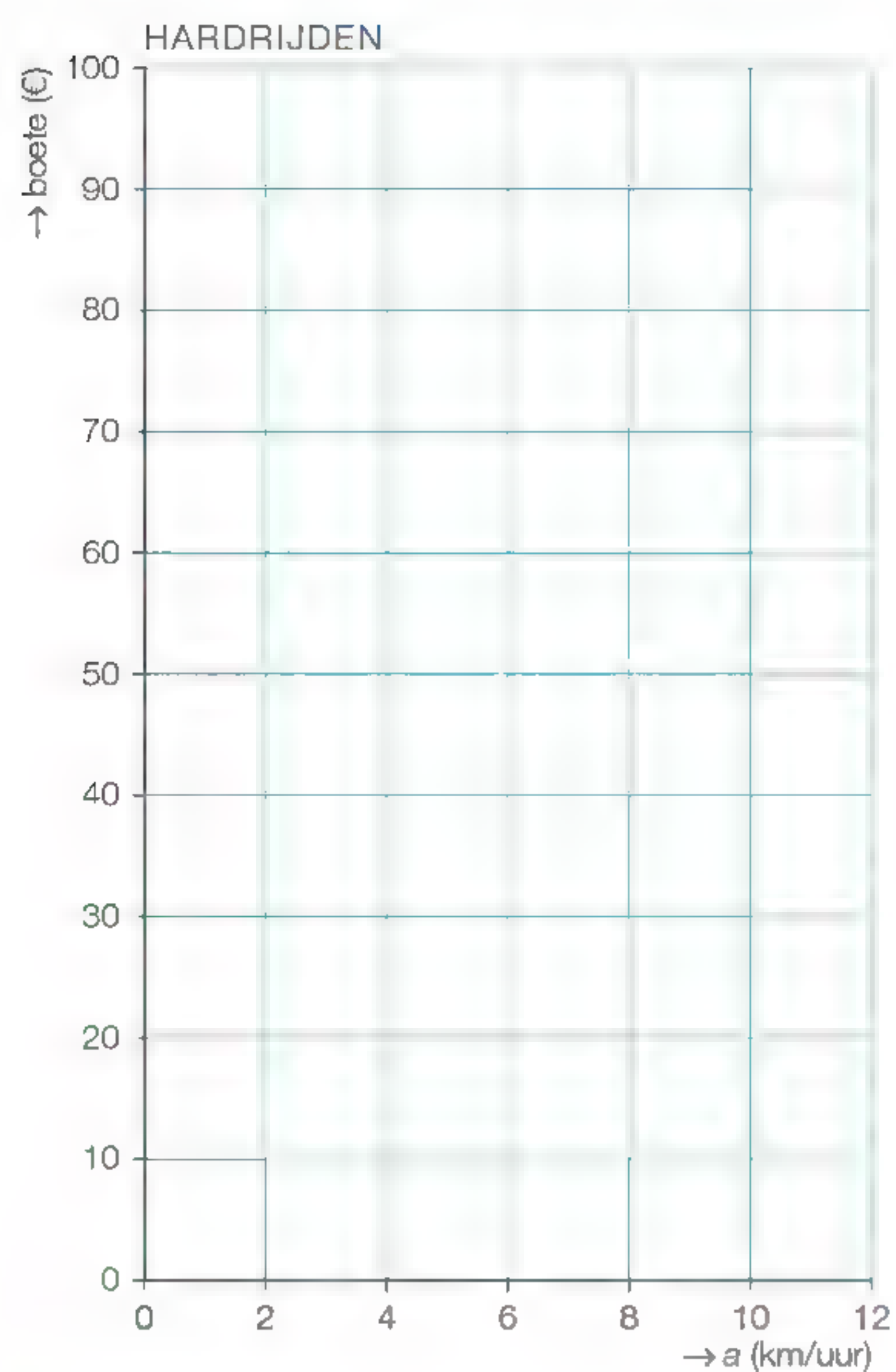




blz 72

HARDRIJDEN

a (km/uur)	0	2	4	6	8	10	12
boete (€)							



blz 73

WINST NIEUW GEWAS

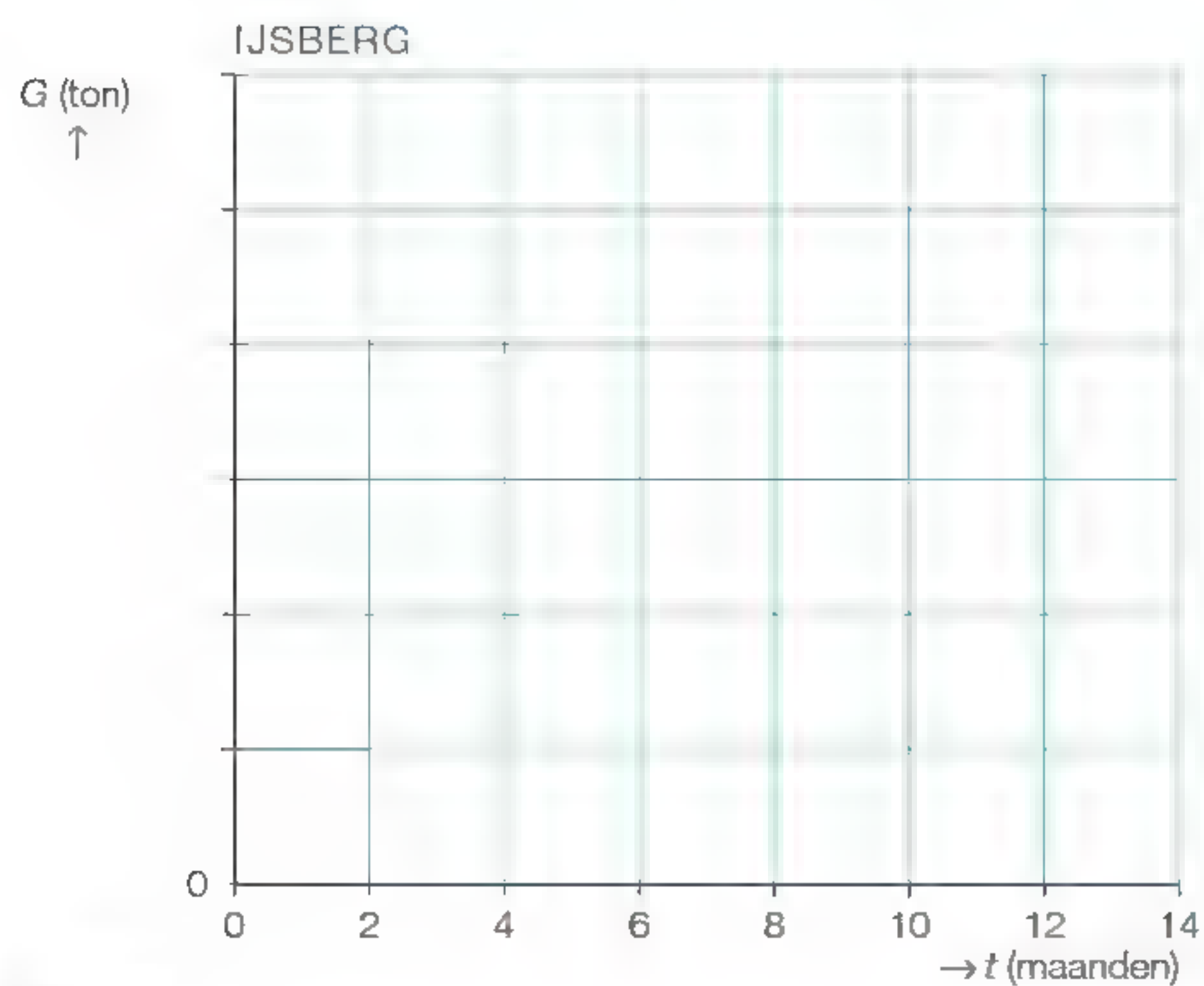
a (are)	0	400	800	1200	1600	2000
W (€)						



blz 74

IJSBERG

t (maanden)	0	2	4	6	8	10	12	14
G (ton)								

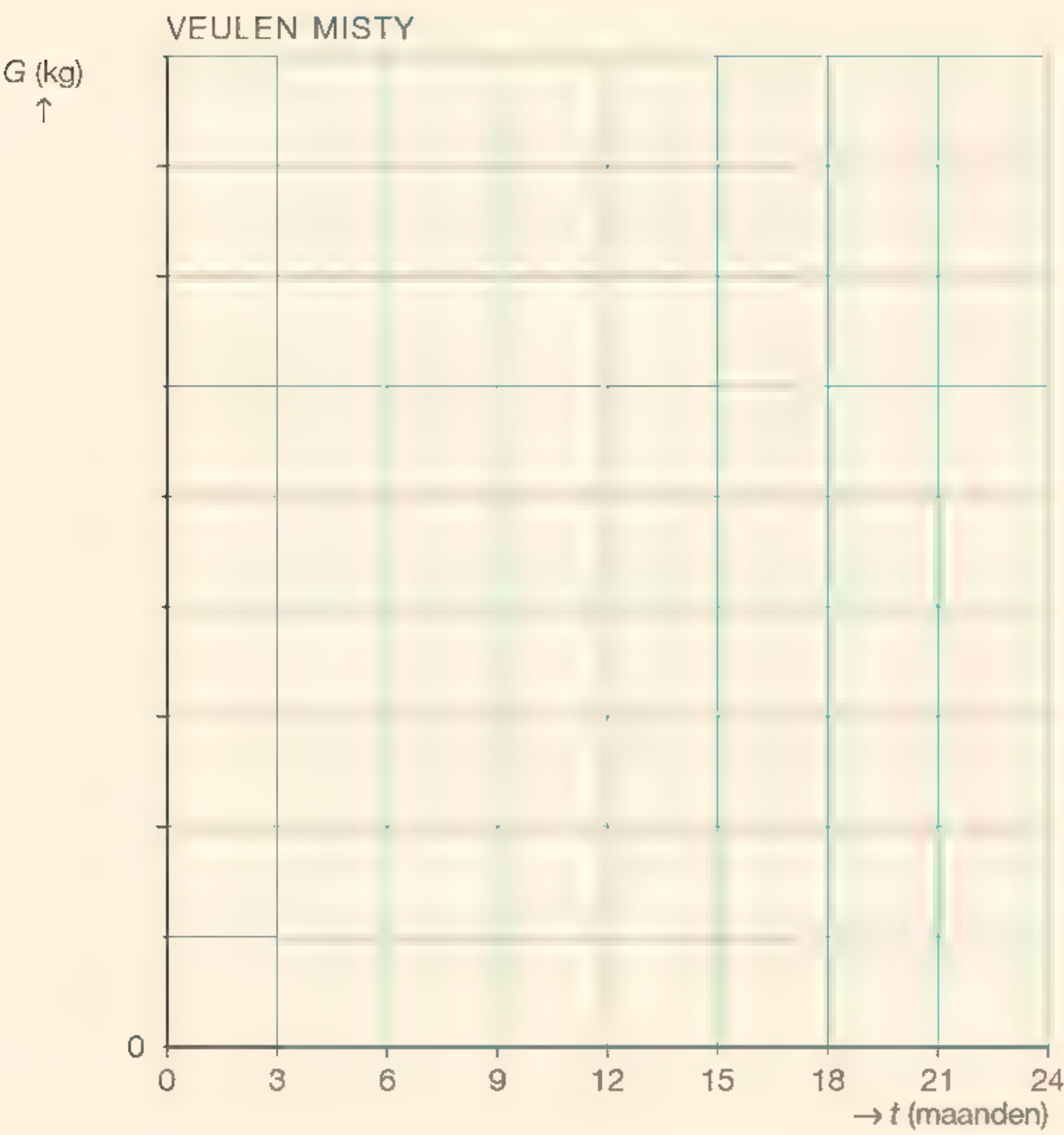




Veulen

blz 77 VEULEN MISTY

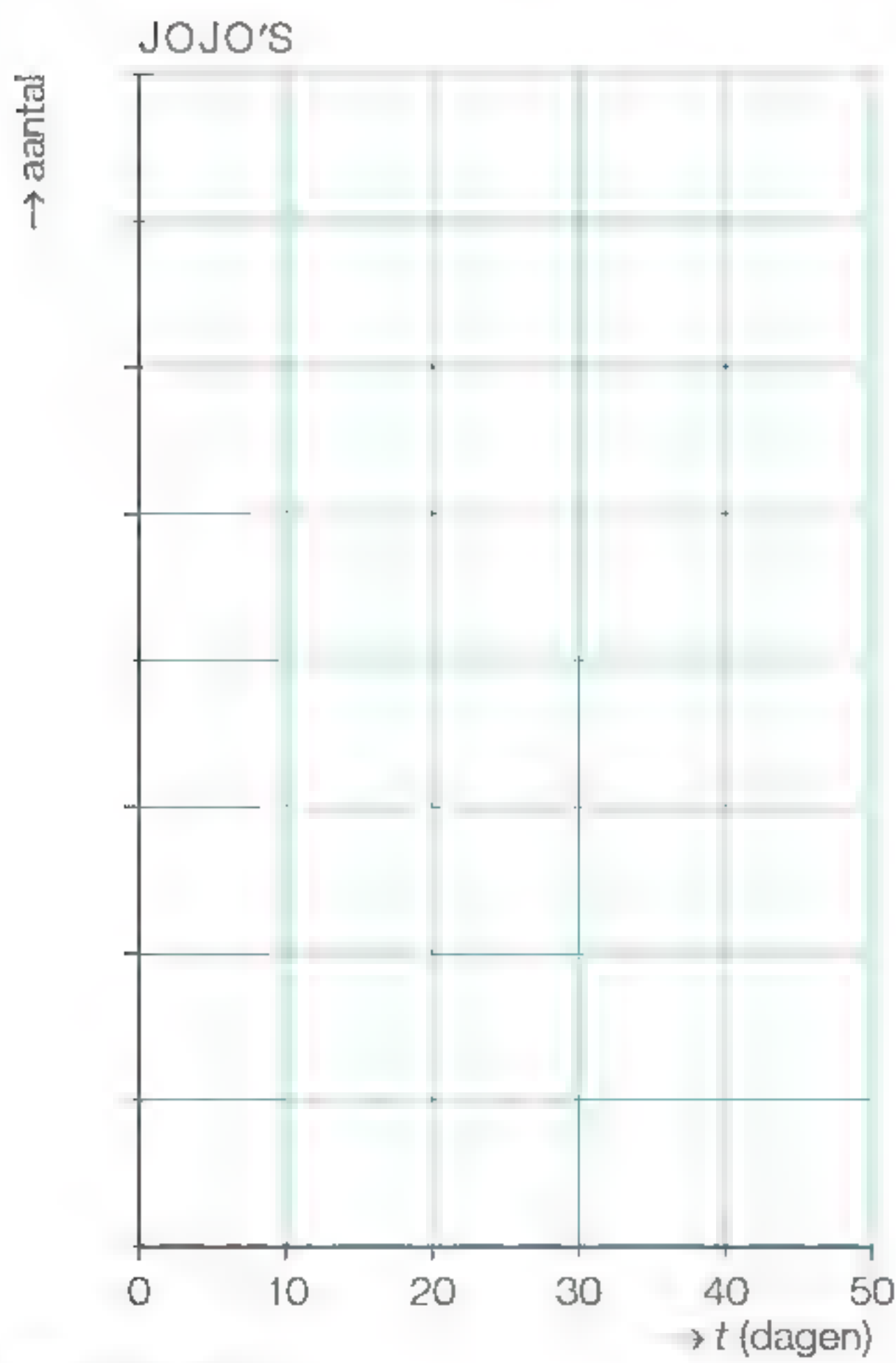
t (maanden)	0	3	6	9	12	15	18	21	24
G (kg)									



JOJO'S

blz 77

t (dagen)	0	10	20	30	40	50
aantal	0					750





KOELKAST

blz 78

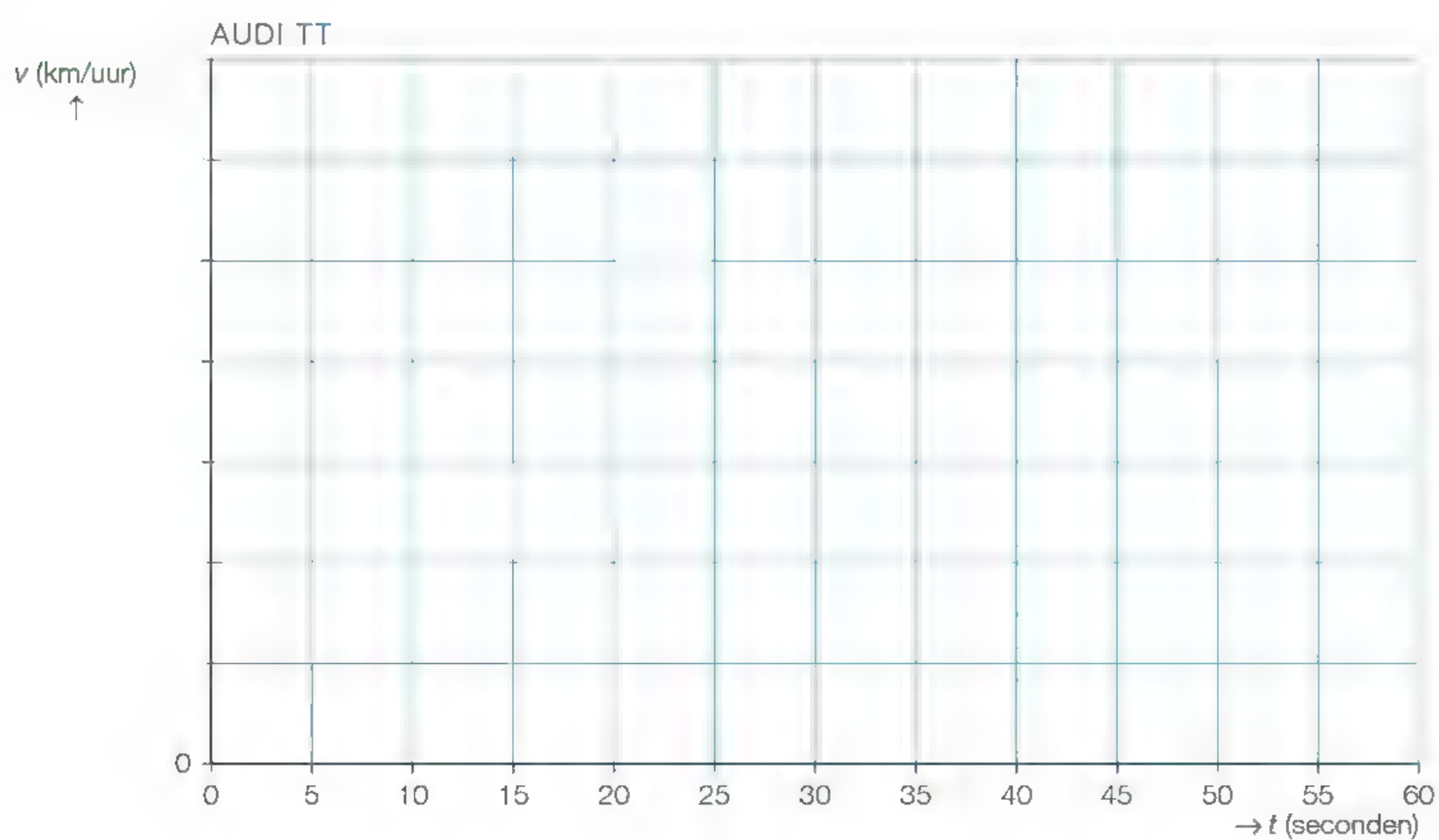
t (uren)	0	5	10	15	20	25
T (°C)						



AUDI TT

blz 79

t (seconden)	0	5	10	20	30	45	60
v (km/uur)							

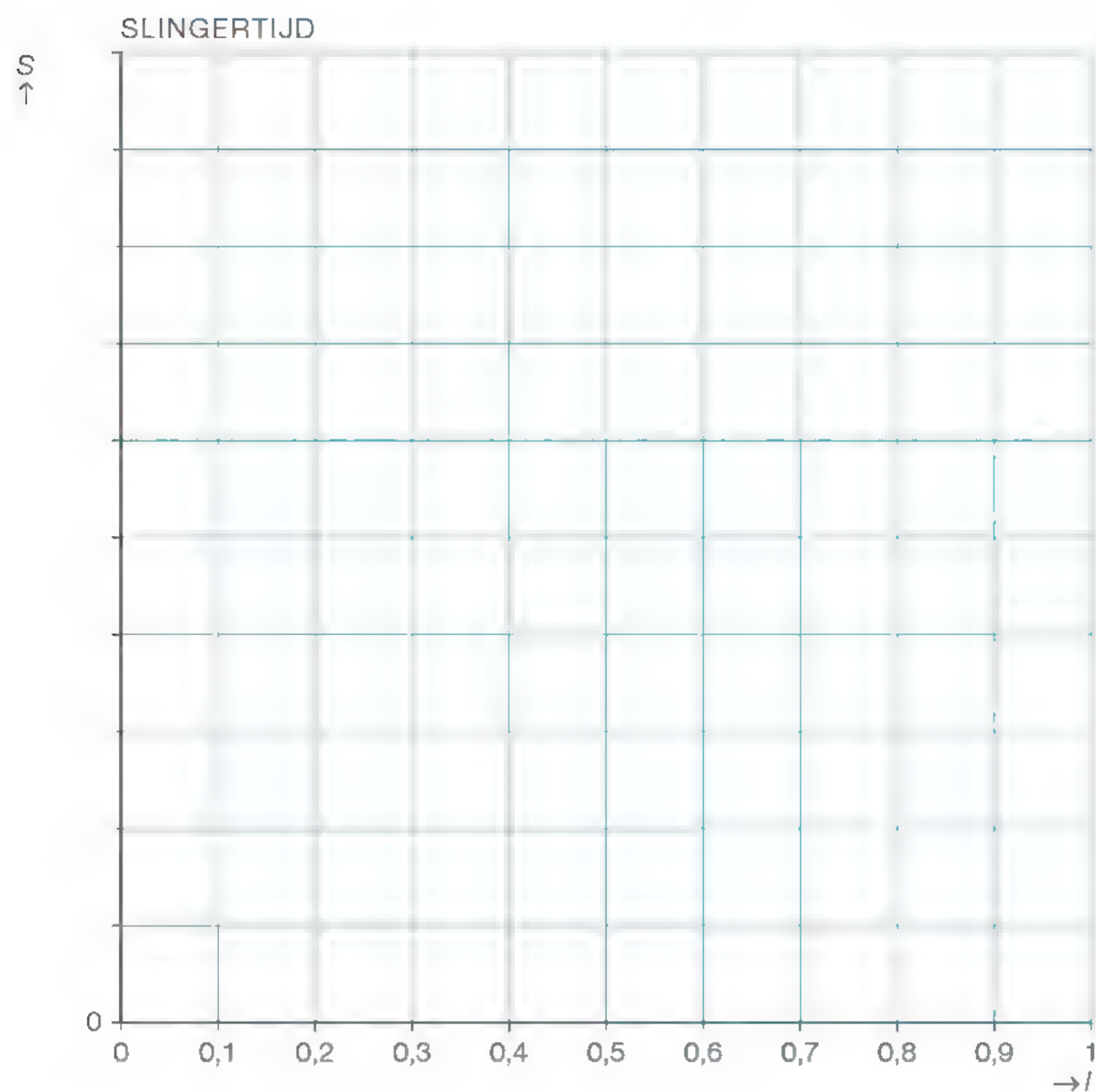




SLINGERTIJD

blz 79

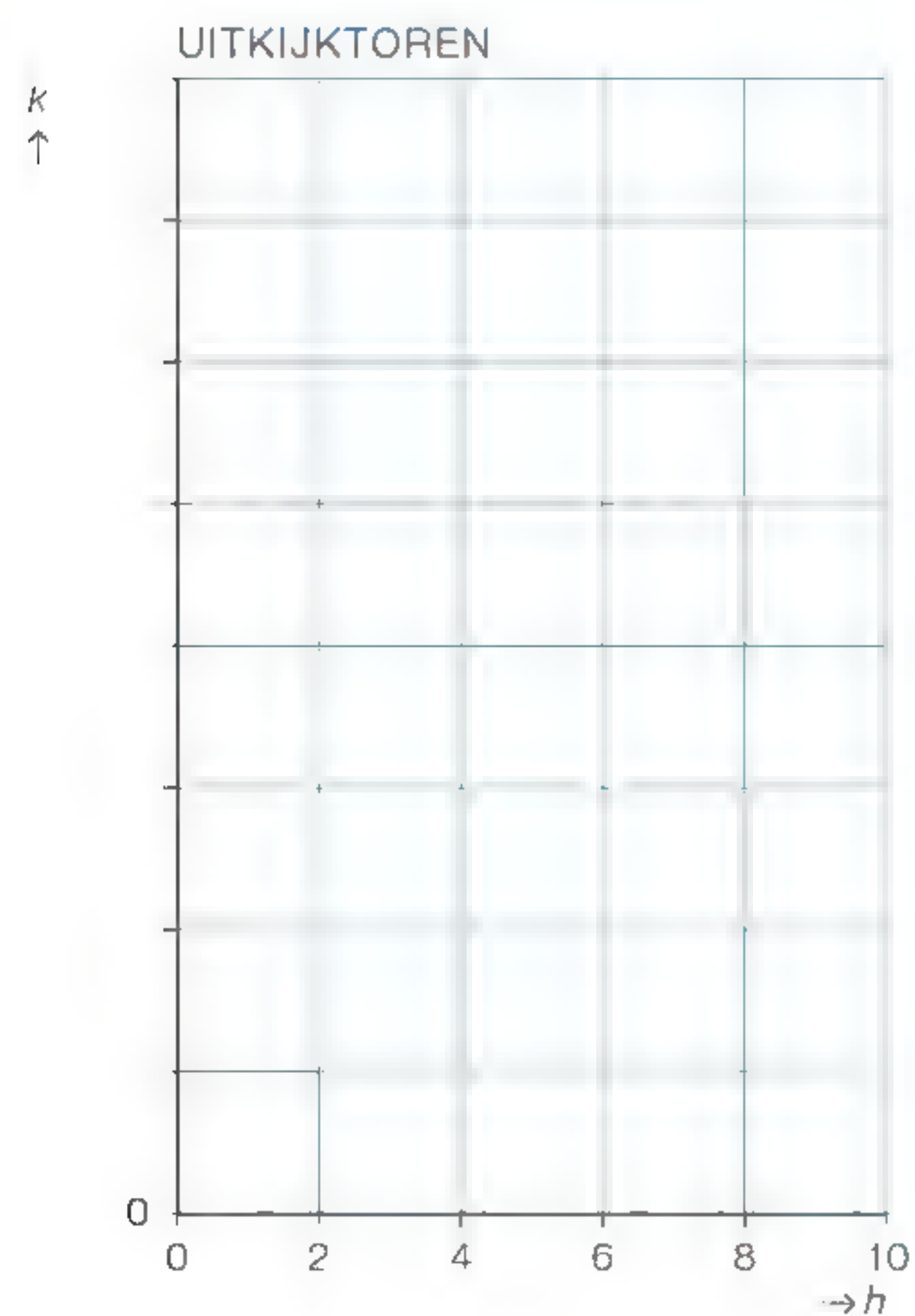
l	0	0,1	0,15	0,2	0,4	0,6	0,8	1
S								



UITKIJKTOREN

blz 80

h	0	2	4	6	8	10
k						

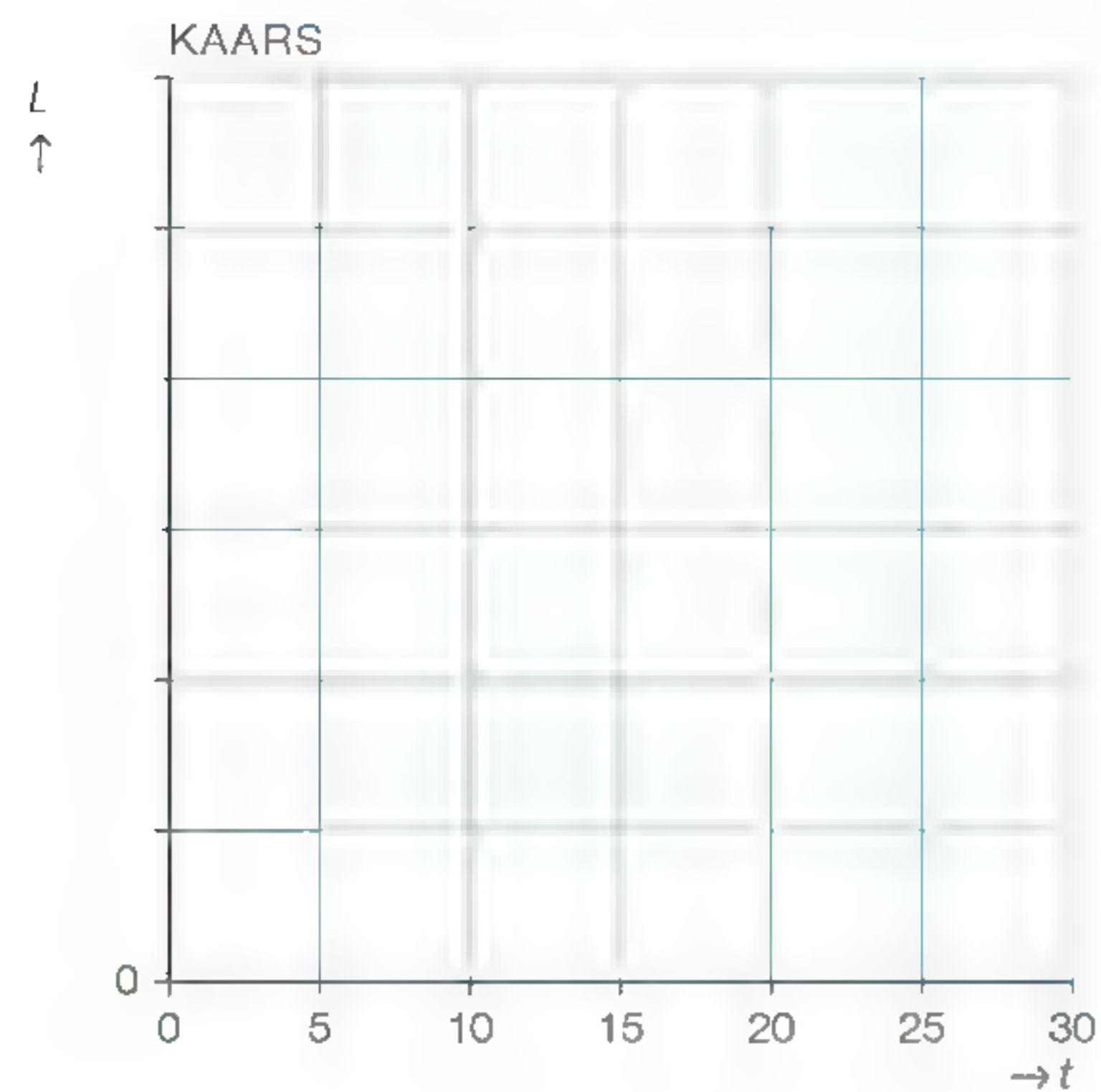




blz 80

KAARS

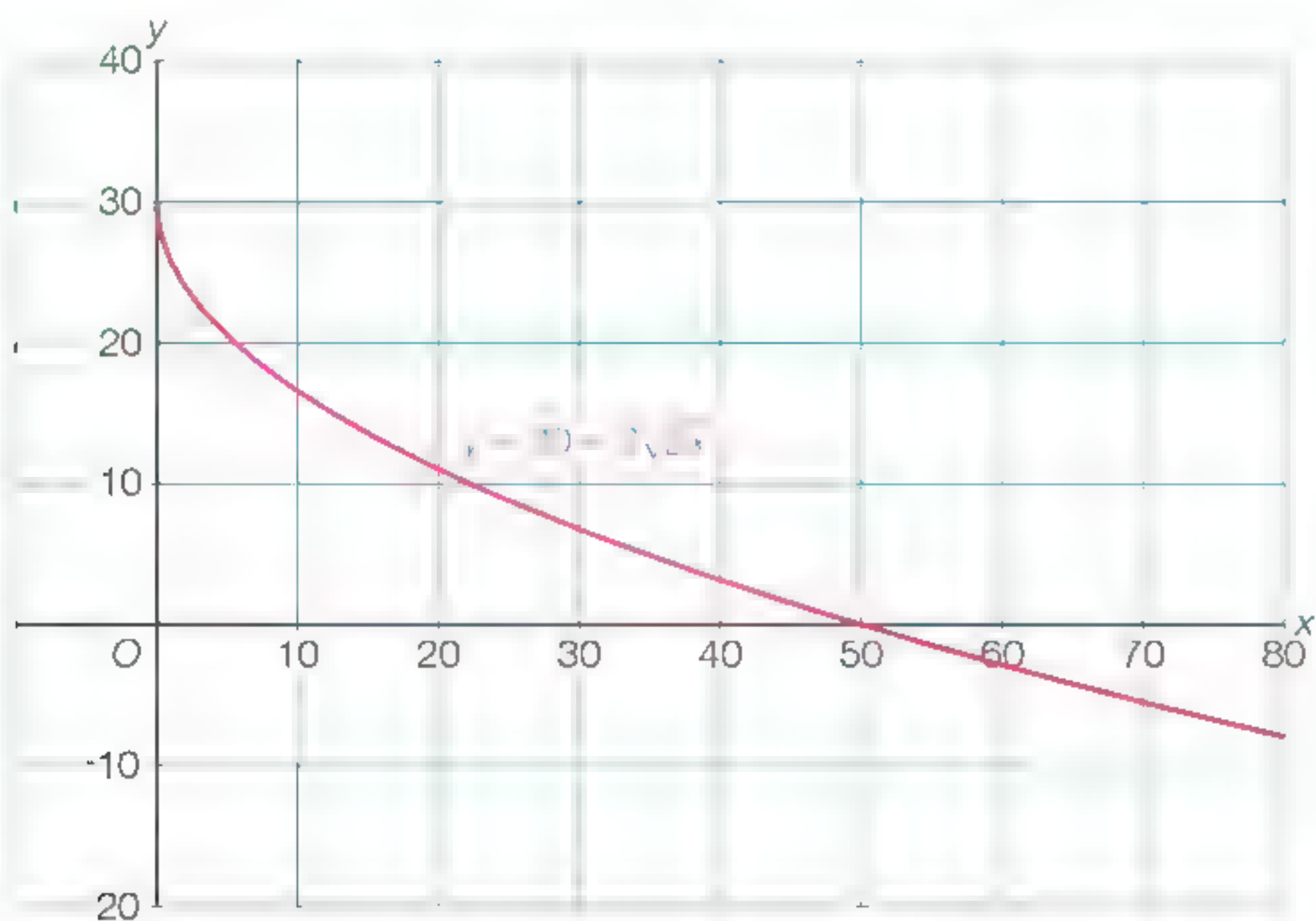
t	0	5	10	15	20	25	30
L							



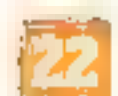
blz 81

$$y = 20 - 3\sqrt{2x}$$

x	0	10	20	30	40	50	60	70	80
y									



2.3 Exponentiële verbanden



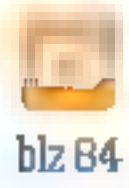
blz 82

ZIEKE MENSEN STAD 1

tijd (dagen)	0	1	2	3	4	5
aantal	20	40				

ZIEKE MENSEN STAD 2

tijd (dagen)	0	1	2	3	4	5
aantal	20	40				



blz 84

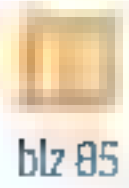
variabele onder
in de tabel

begingetal

groeifactor

variabele boven
in de tabel

..... = ×



blz 85

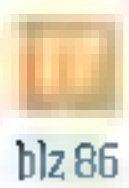
variabele onder
in de tabel

begingetal

groeifactor

variabele boven
in de tabel

..... = ×



blz 86

I

t	0	1	2	3
aantal	75	90		

II

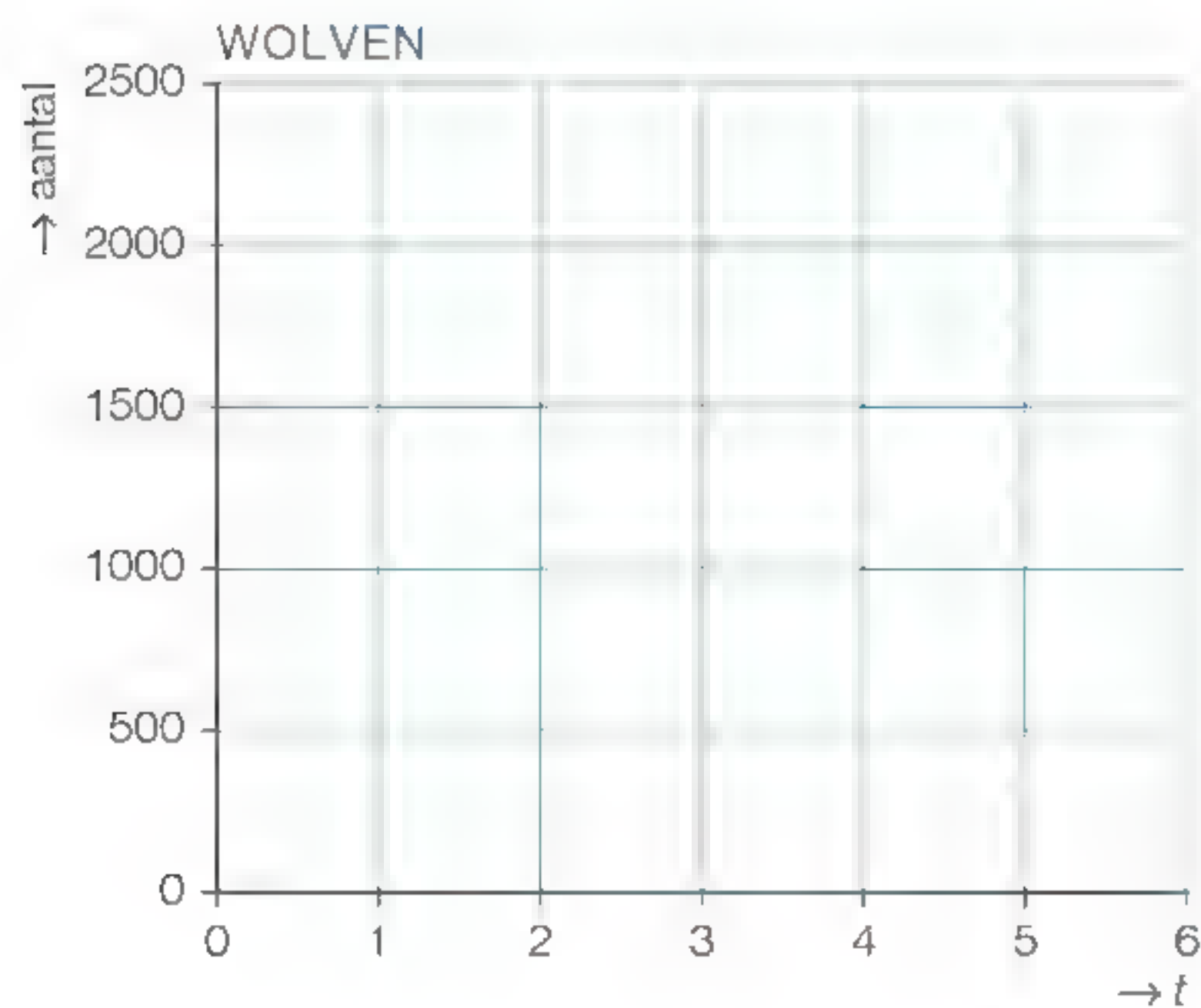
t	0	1	2	3
aantal	100	180		



blz 86

WOLVEN

t	0	1	2	3	4	5	6
aantal							



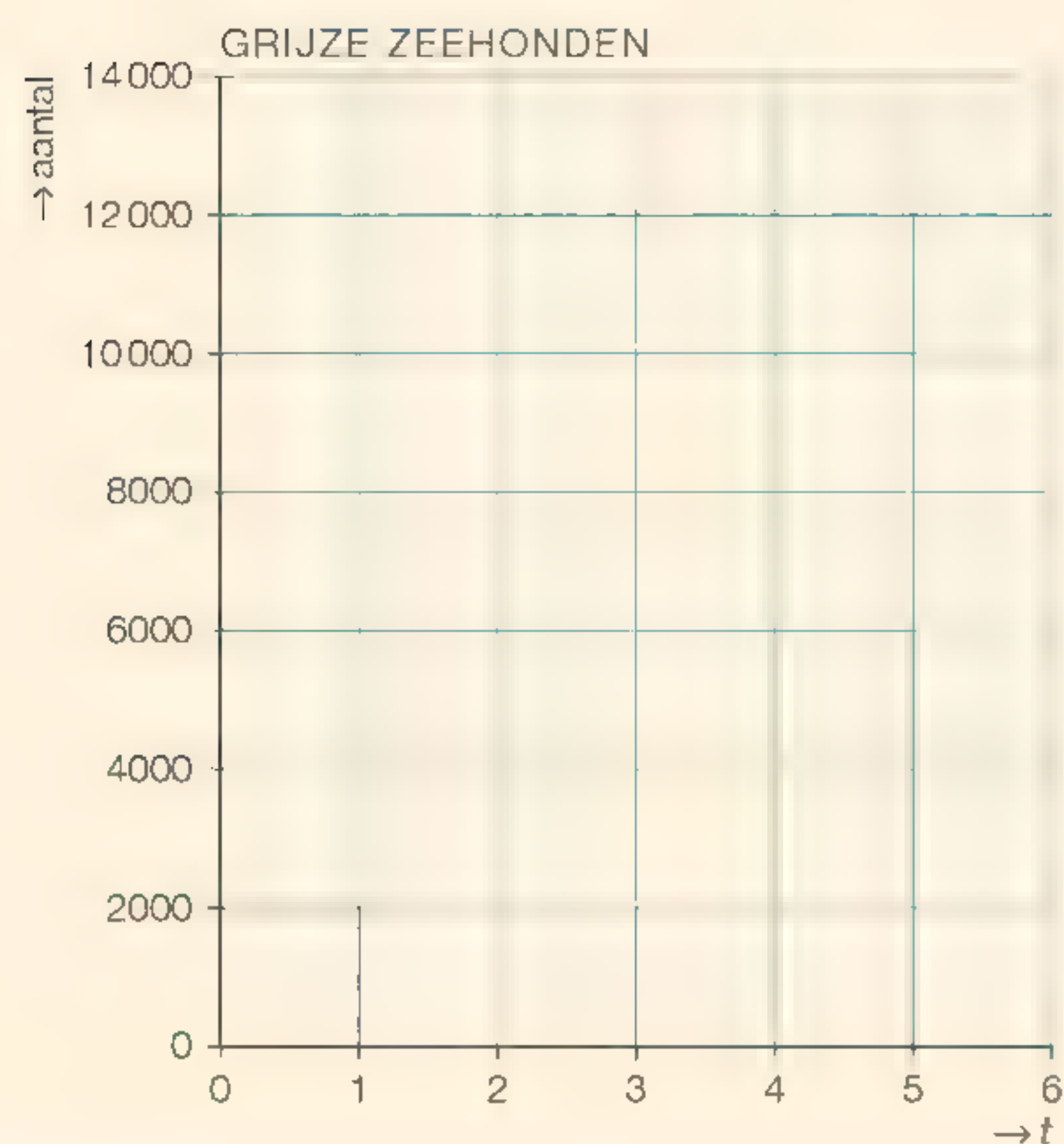


Zeehonden

blz 88

GRIJZE ZEEHONDEN

t	0	1	2	3	4	5	6
aantal							

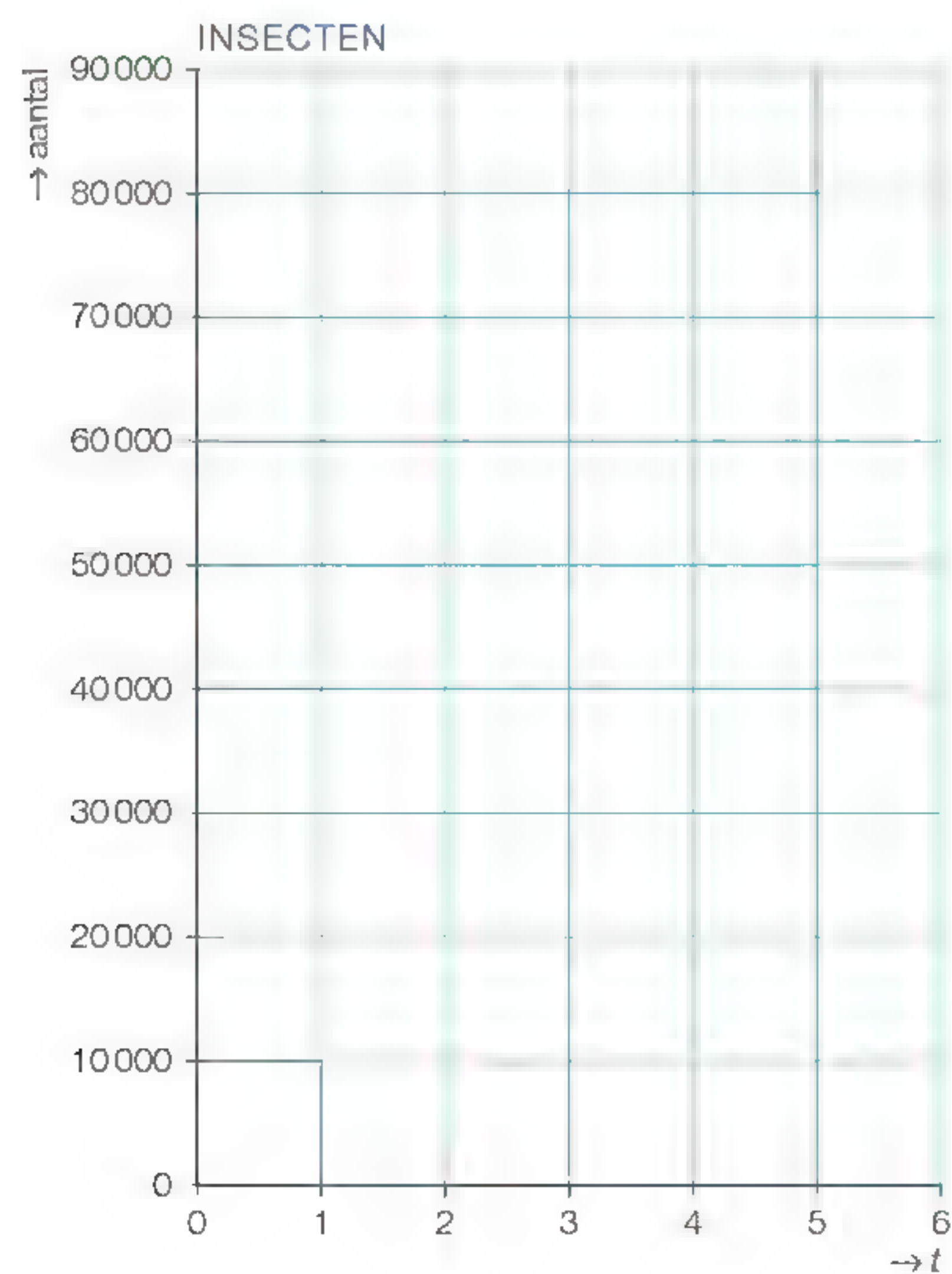


29

INSECTEN

blz 89

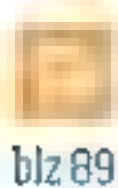
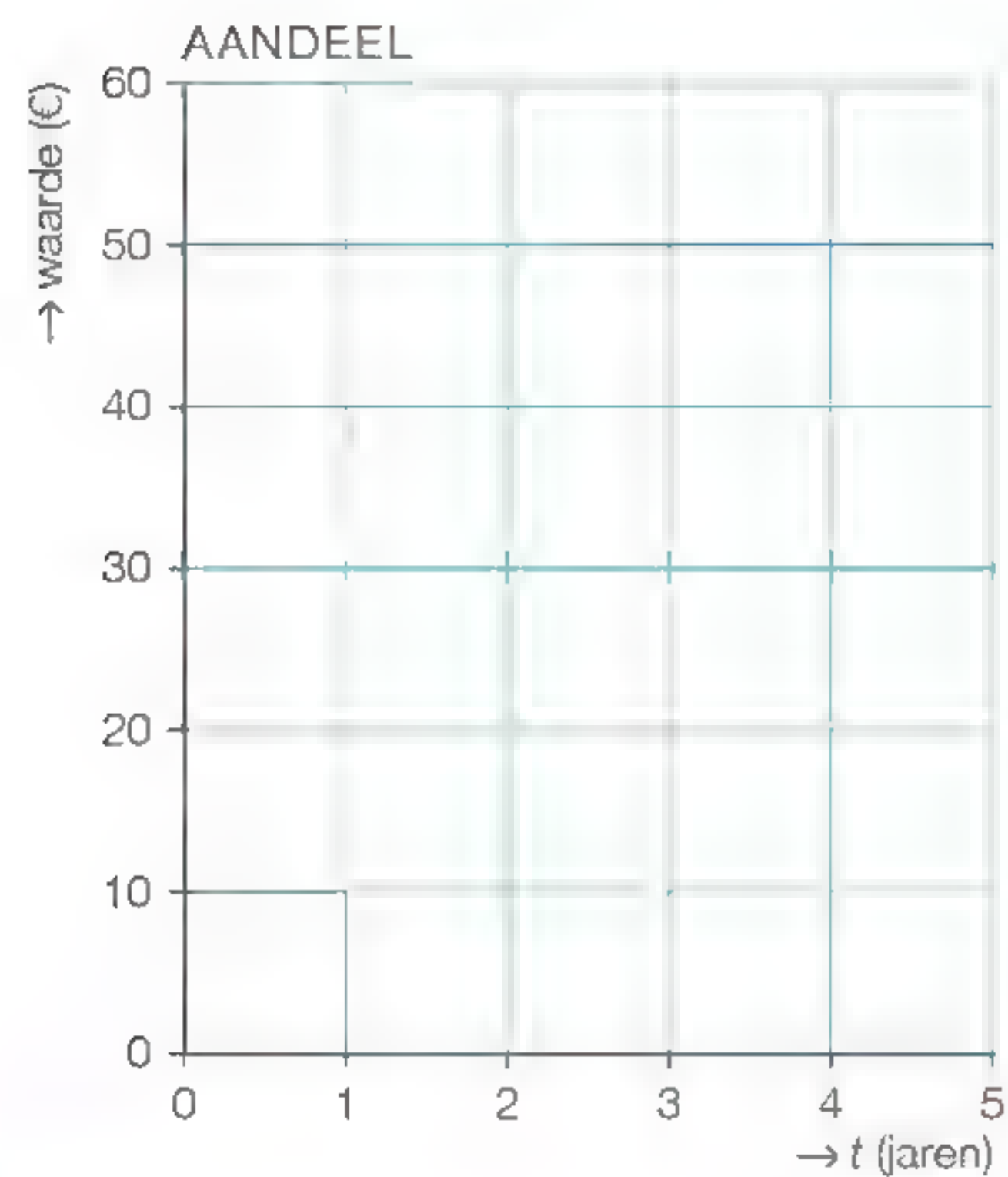
t	0	1	2	3	4	5	6
aantal							





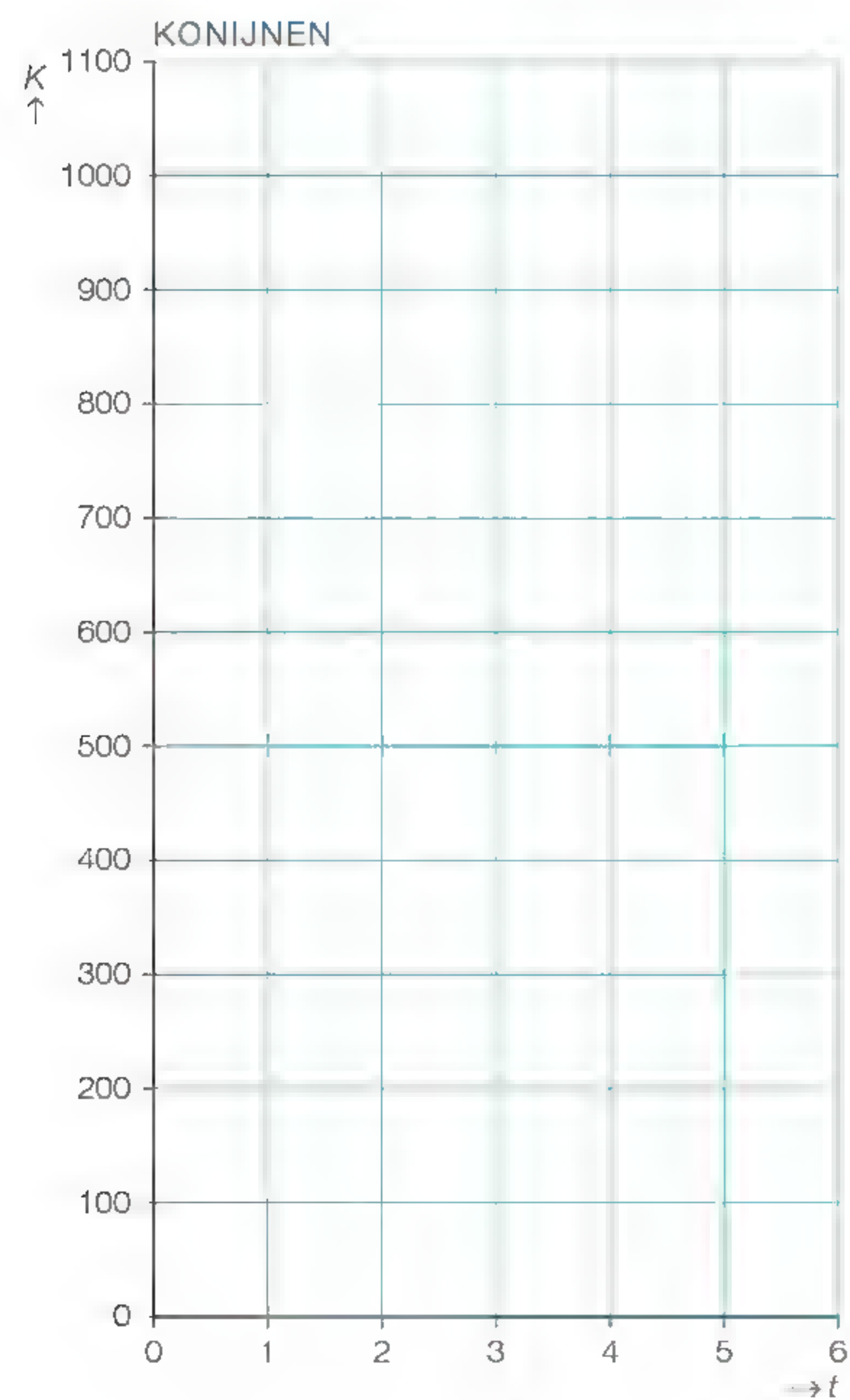
AANDEEL

t (jaren)	0	1	2	3	4	5
waarde (€)	25					



KONIJNEN

t	0	1	2	3	4	5	6
K							

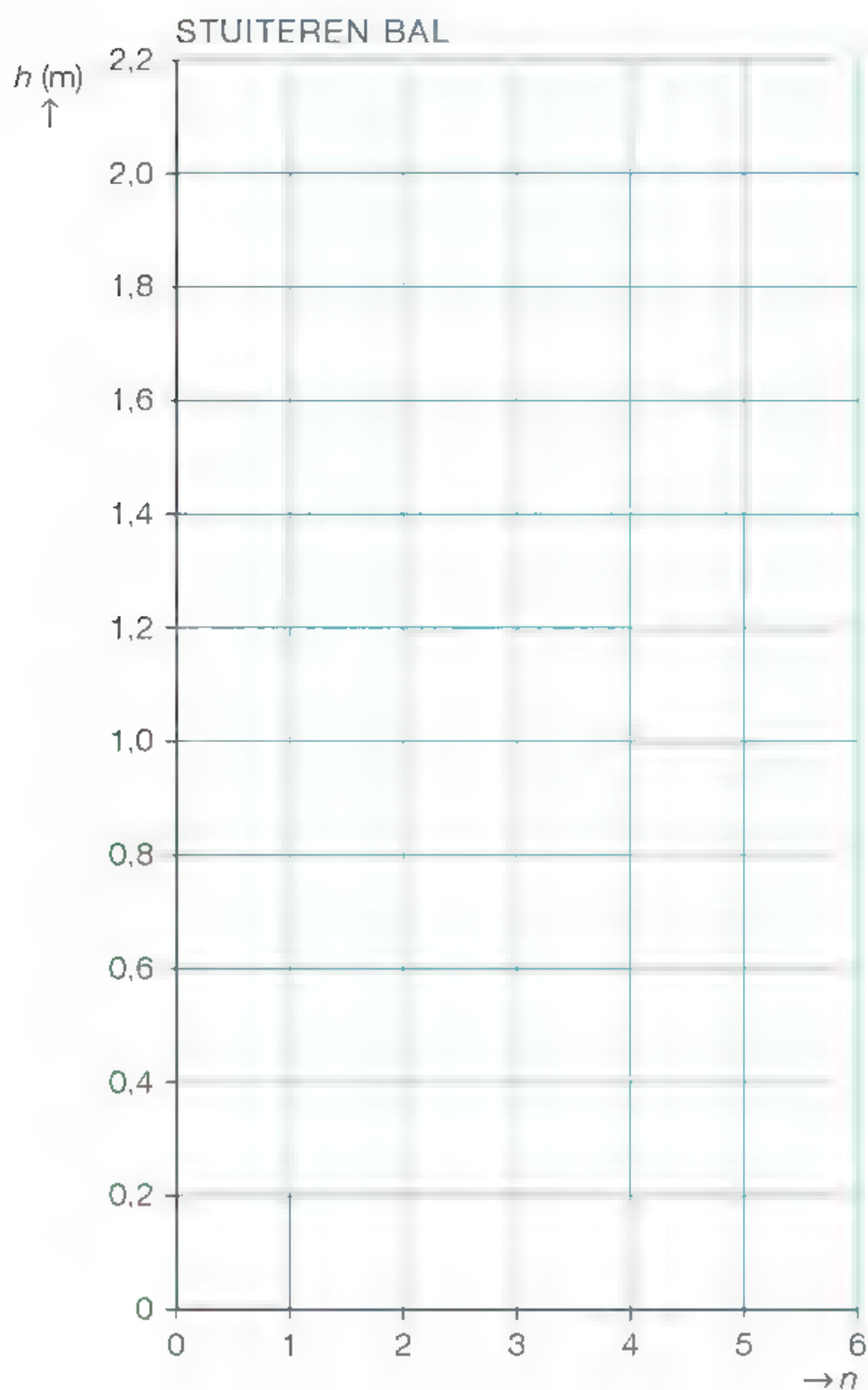


33

STUITEREN BAL

blz 90

n	0	1	2	3	4	5	6
h (m)							



2.4 Exponentiële groei en procenten

36

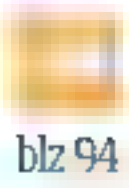
blz 93

formule	beginbedrag	groefactor	toename	bedrag na 5 jaar
$B = 300 \times 1,15^t$	€ 300	1,15	15%	€ 603,41
$B = 300 \times 1,08^t$				
$B = 80 \times 1,12^t$				

37

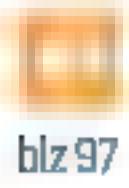
blz 93

$$\text{spaarbedrag} = \text{begingetal} \times \text{groefactor}^t$$

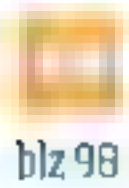


blz 94

formule	beginbedrag	groefactor	toename	bedrag na 10 jaar
$B = 600 \times 1,07^t$				
$B = \dots \times \dots^t$	€250	1,055		
$B = 1800 \times \dots^t$			23%	



blz 97



blz 98

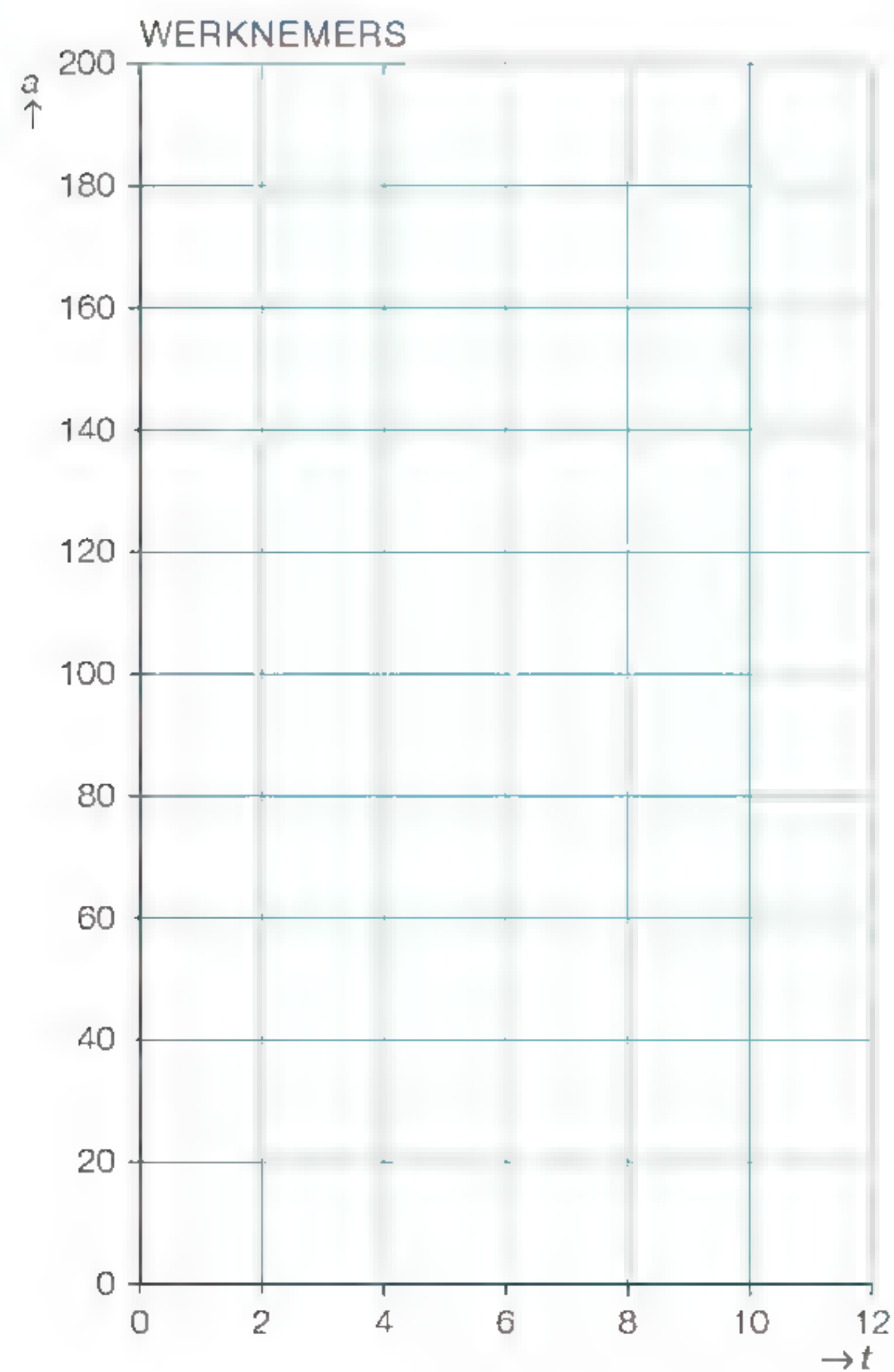
beginbedrag	afname	groefactor	formule	bedrag na 5 jaar
€300	15%		$B =$	
€250		0,65	$B =$	
			$B = 654 \times 0,976^t$	



blz 99

WERKNEMERS

t	0	2	4	6	8	10	12
a							

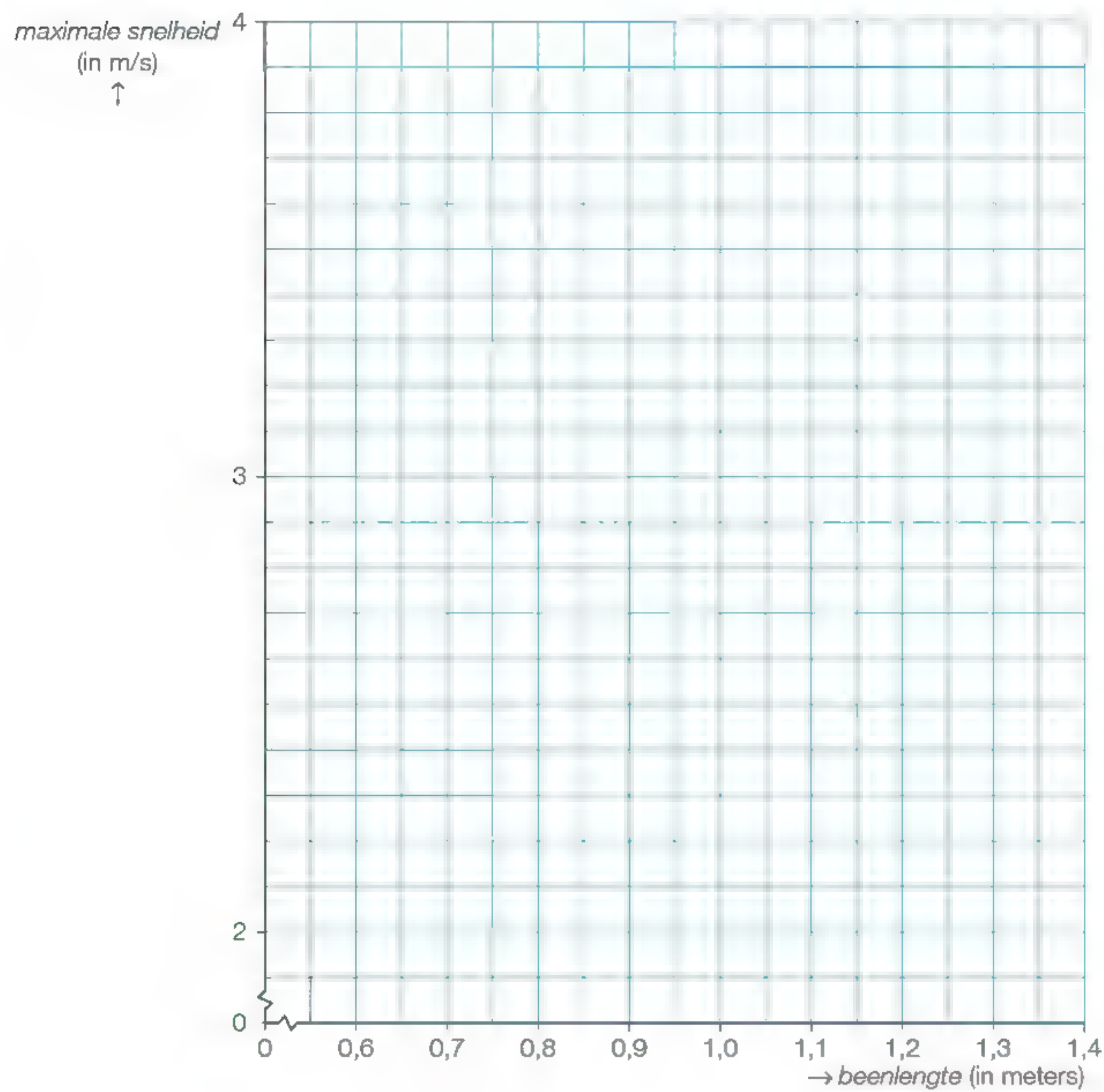


2.5 Trainen op examenniveau

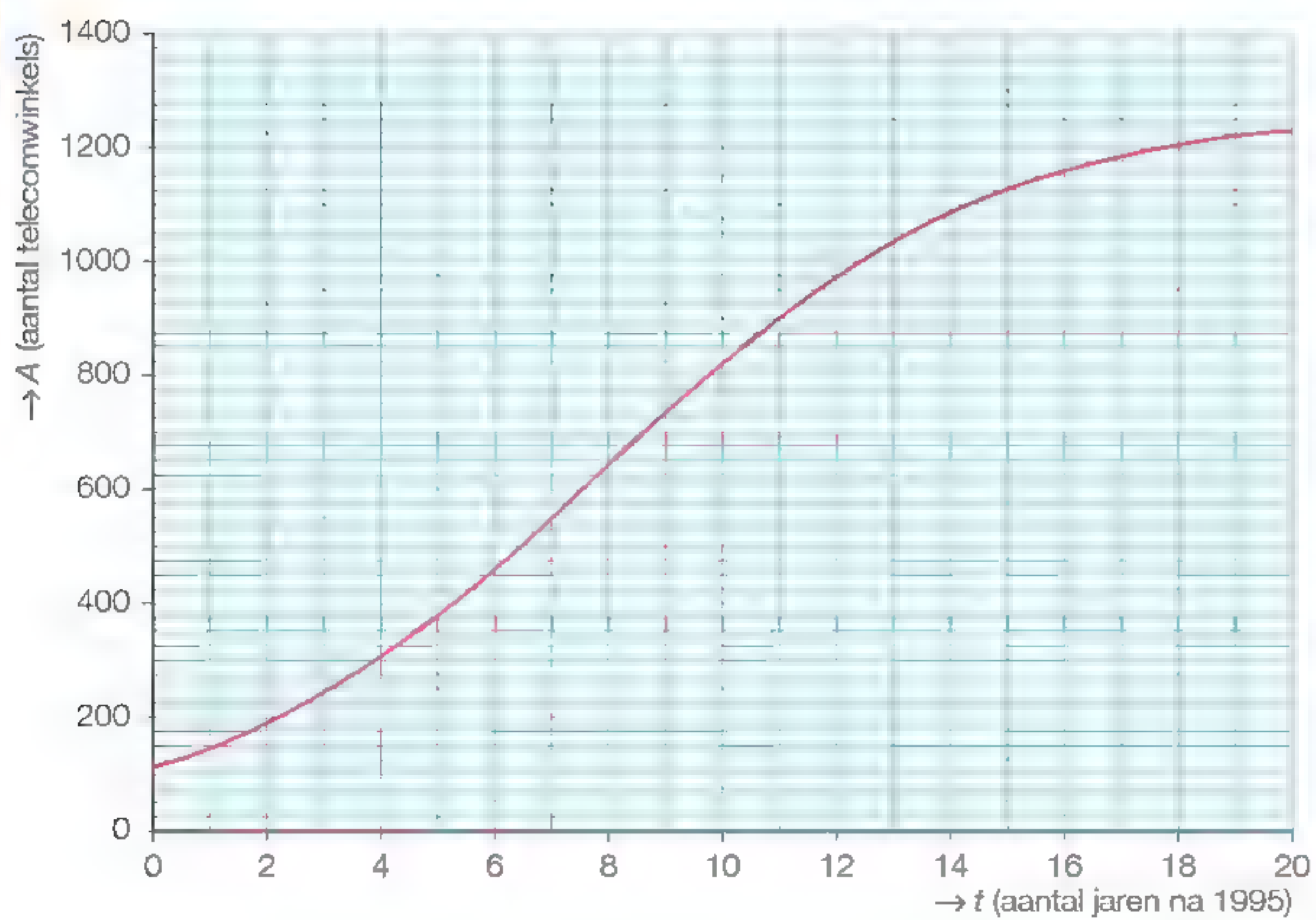
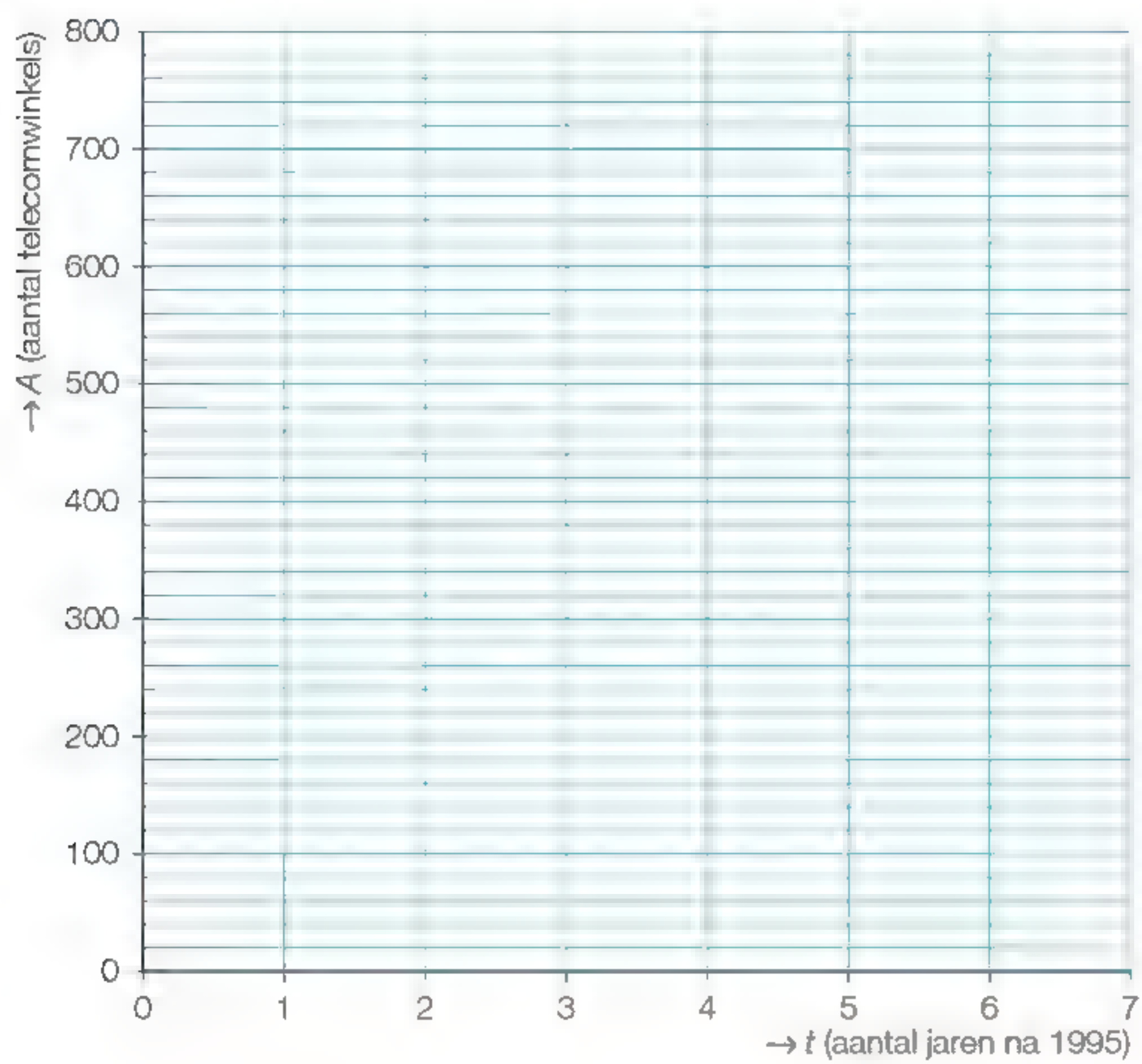
60

blz 103

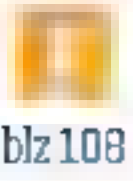
beenlengte (m)	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4
maximale snelheid (m/s)				2,97					



t (aantal jaren na 1995)	0	1	2	3	4	5	6	7
A (aantal telecomwinkels)	115					380		

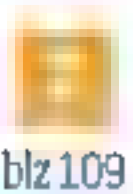
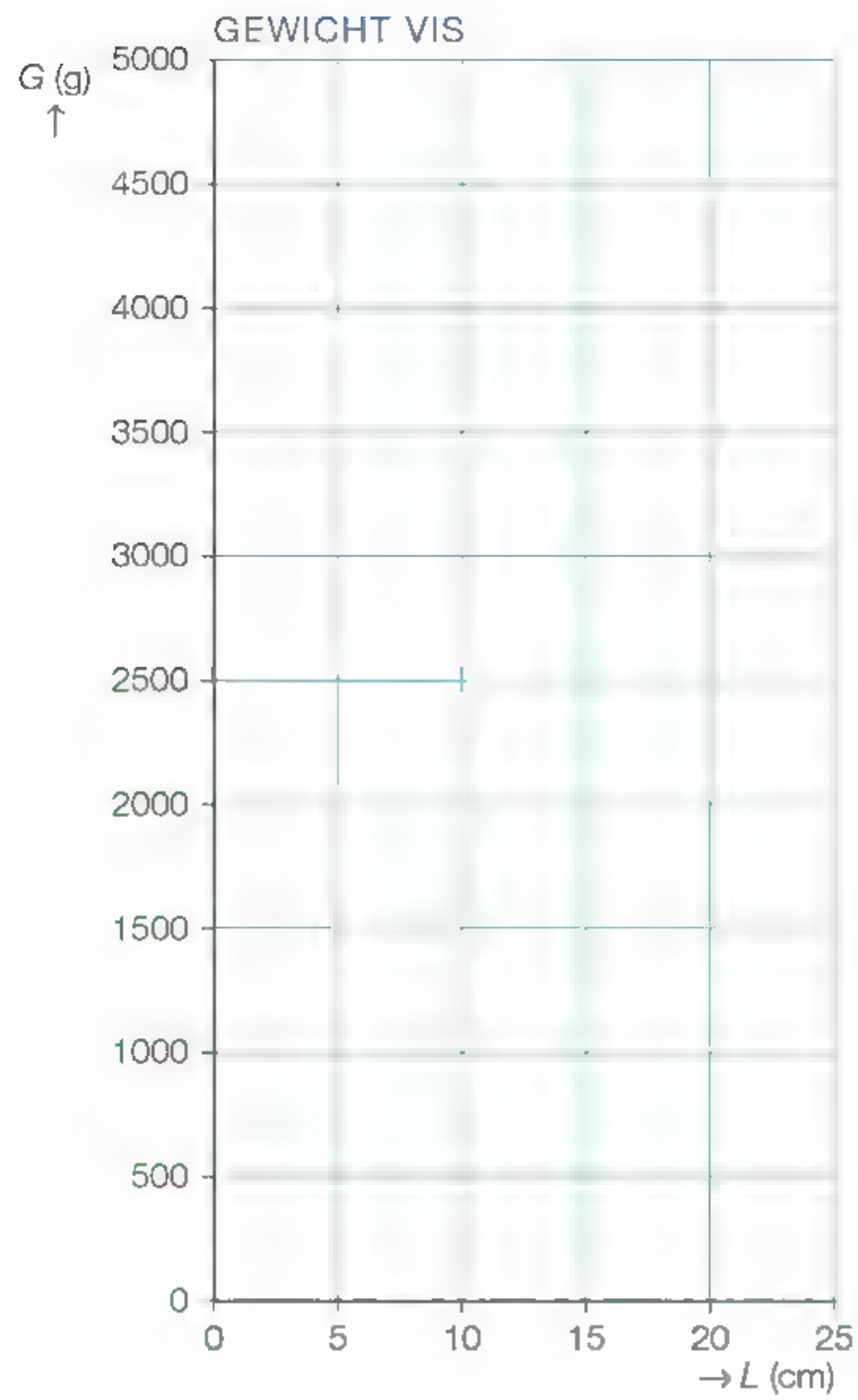


D-toets



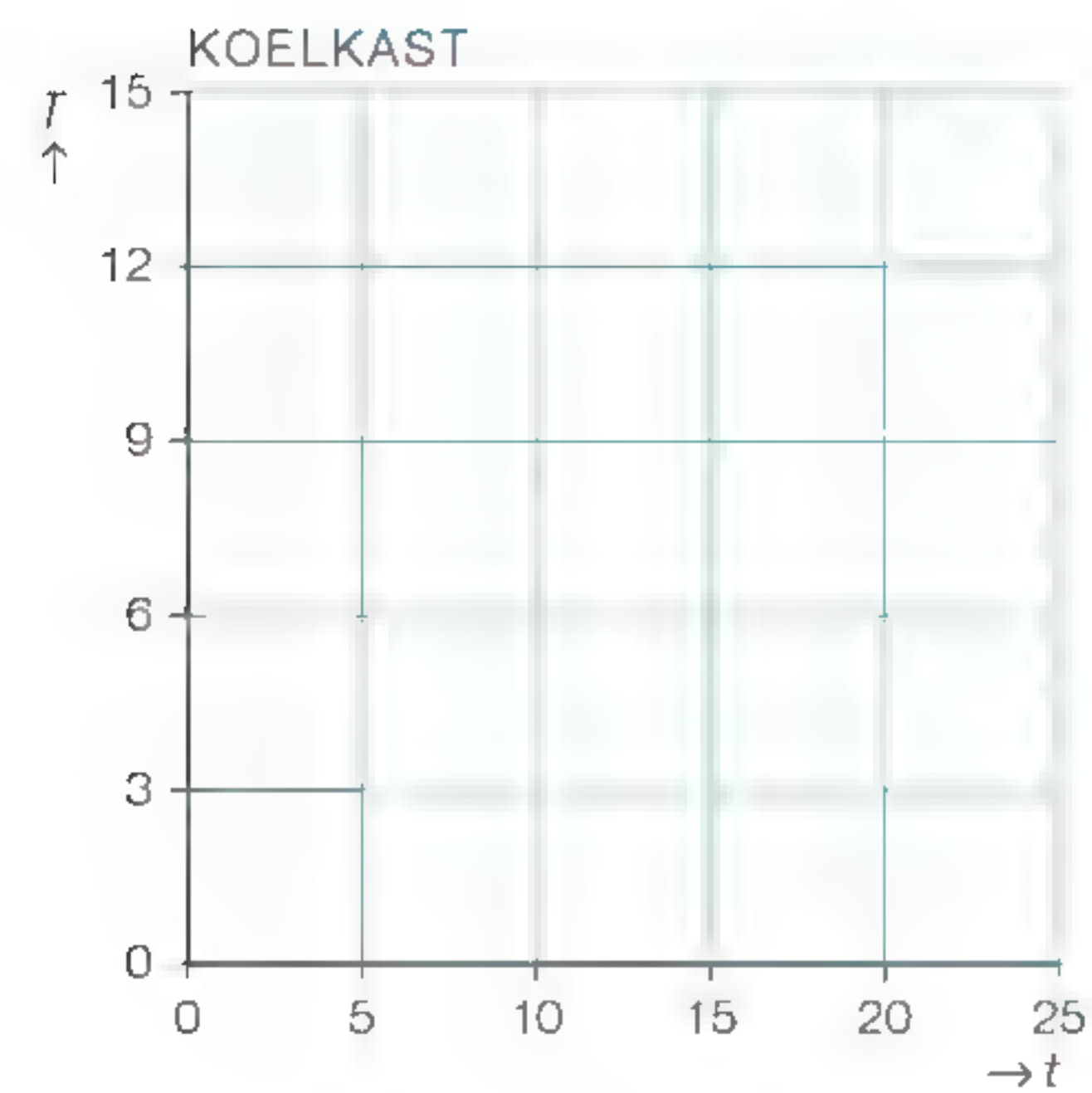
GEWICHT VIS

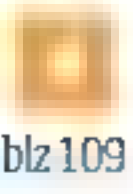
L (cm)	0	5	10	15	20	25
G (g)						



KOELKAST

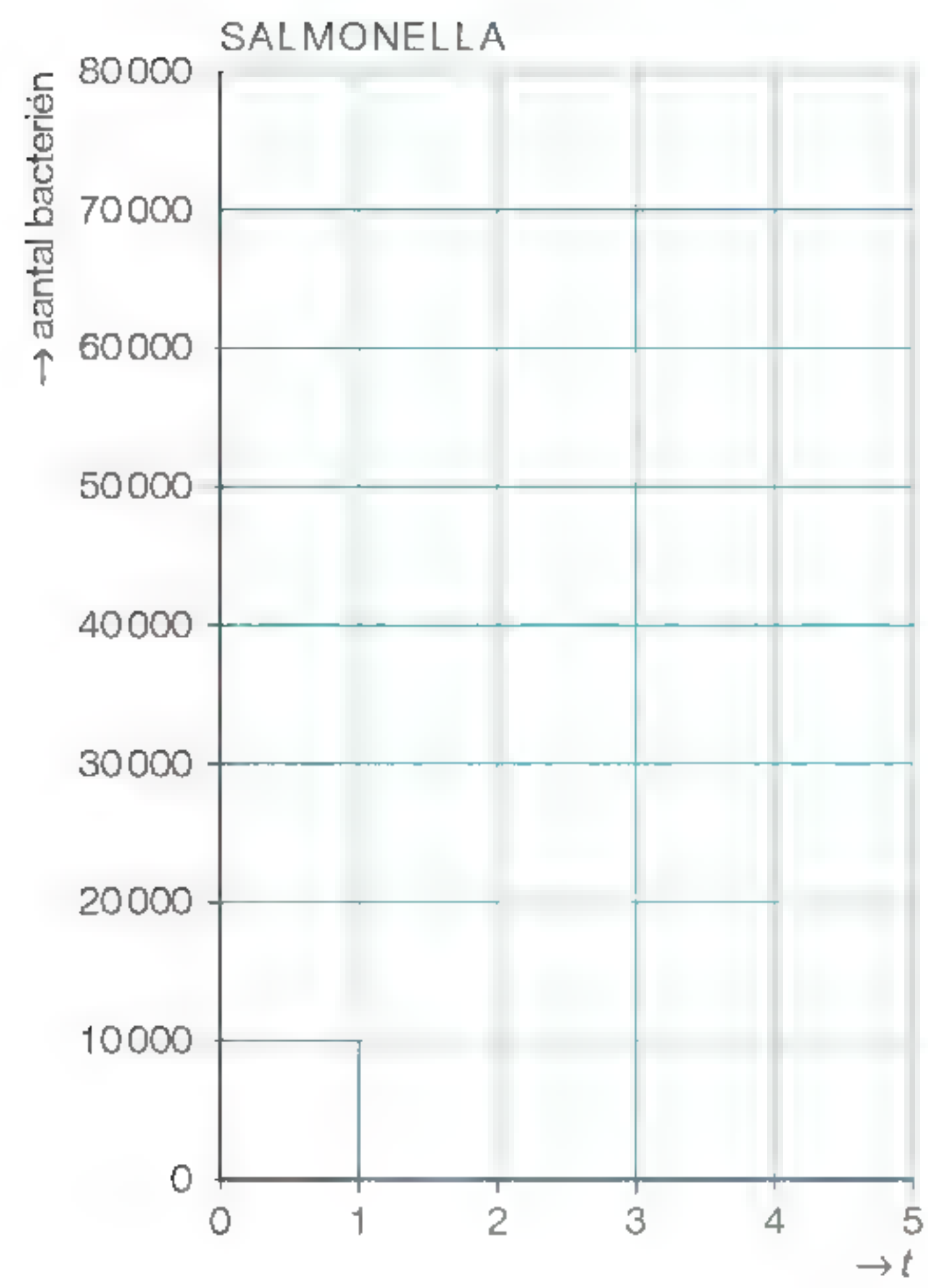
t	0	5	10	15	20	25
T						





SALMONELLA

t	0	1	2	3	4	5
aantal bacteriën	4000					

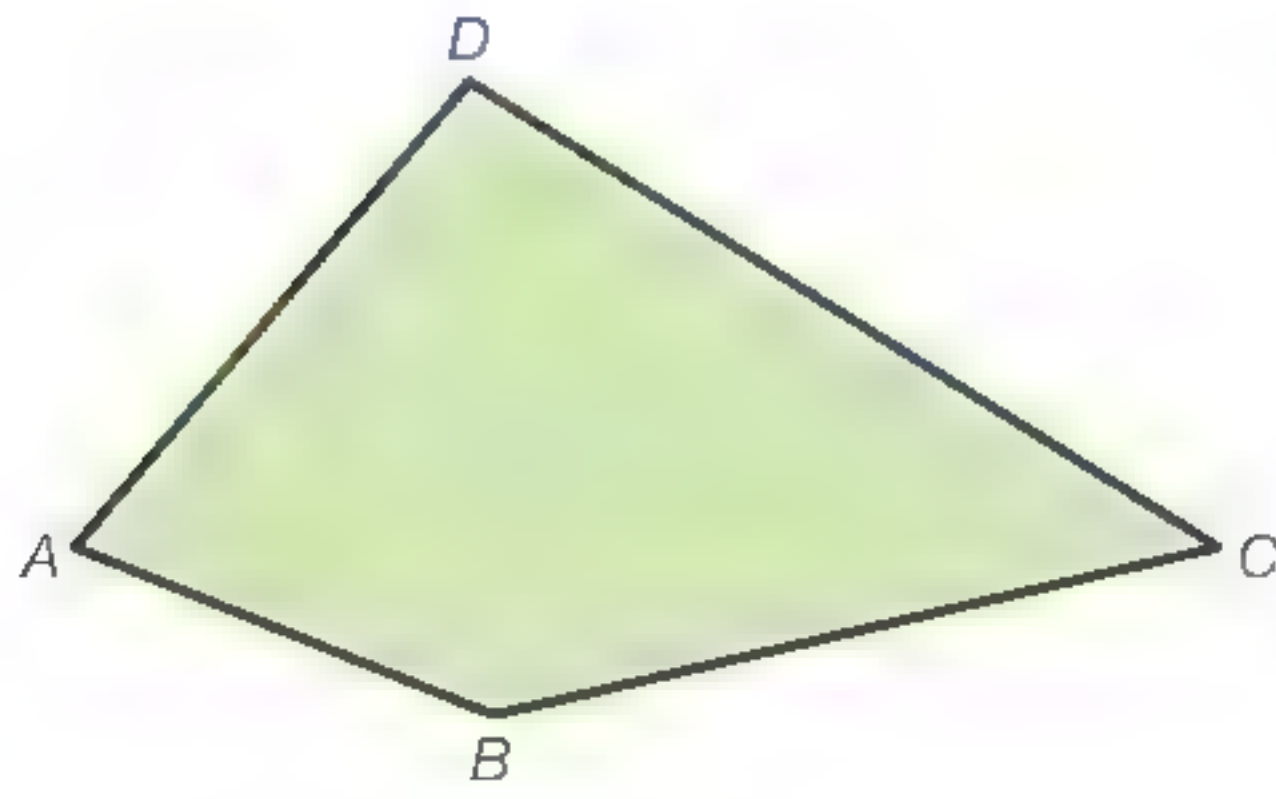


3 Drie dimensies, afstanden en hoeken

Voorkennis Hoeken en goniometrie

4

blz114



11

blz115

S

O

S

C

A

S

T

O

A

3.1 Teken in perspectief



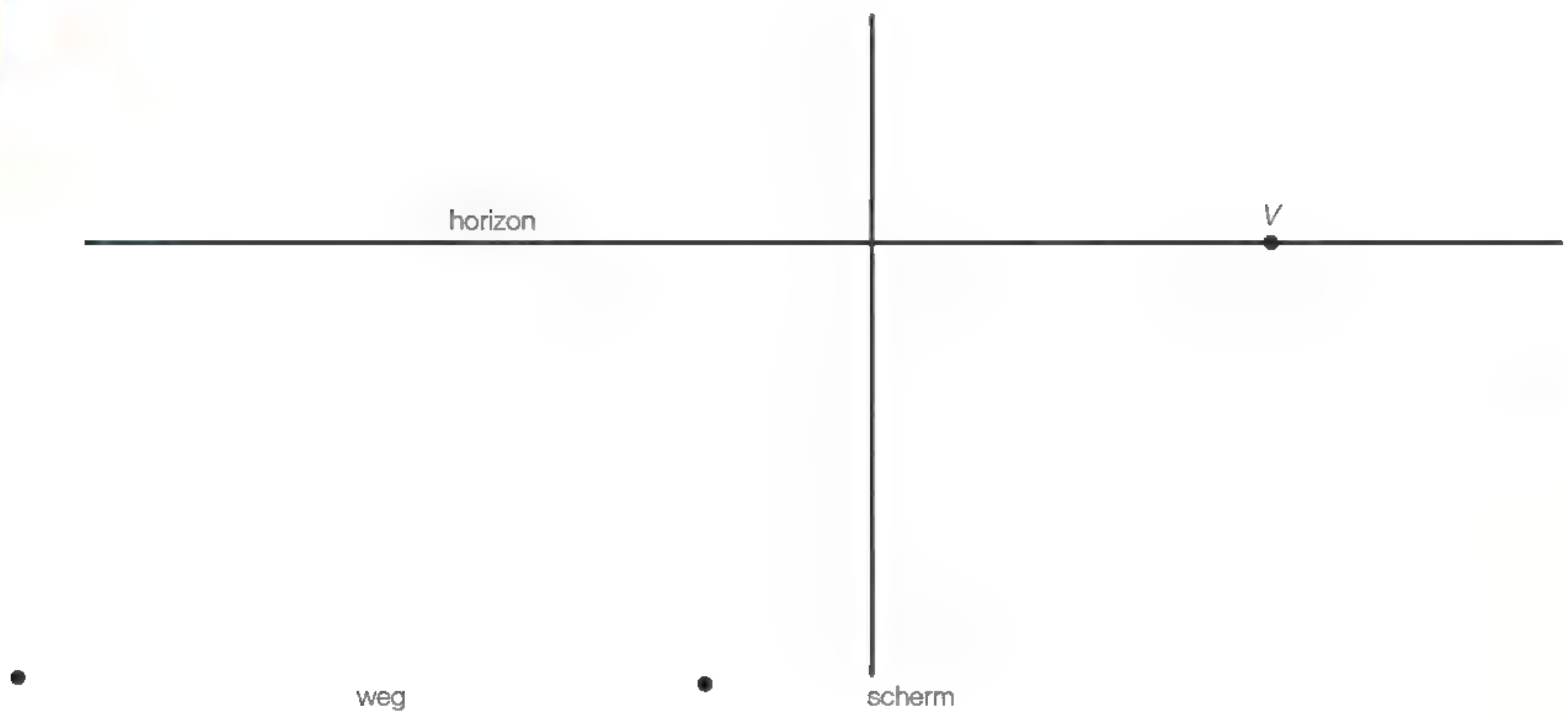
blz 118



weg



blz 119



horizon

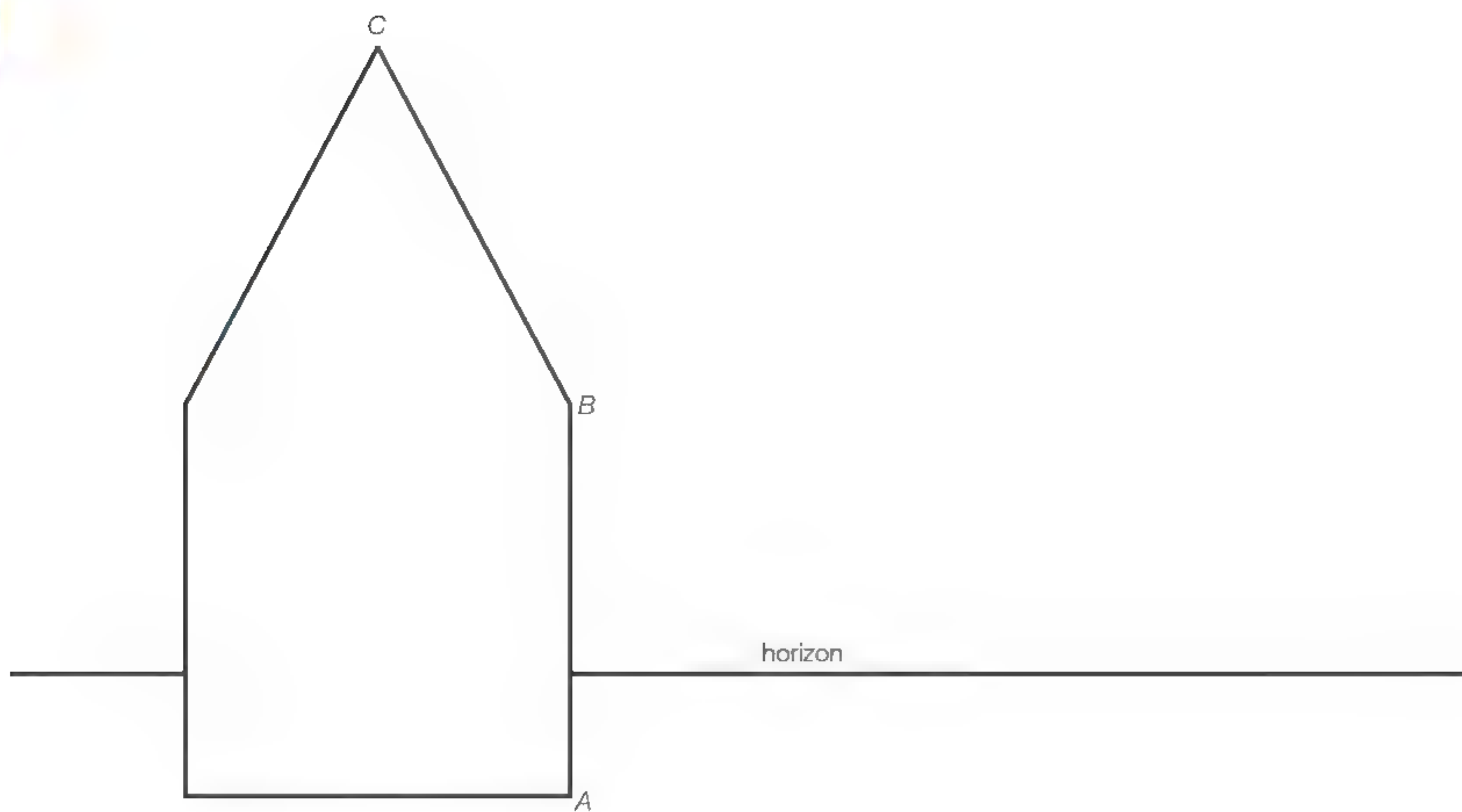
V

weg

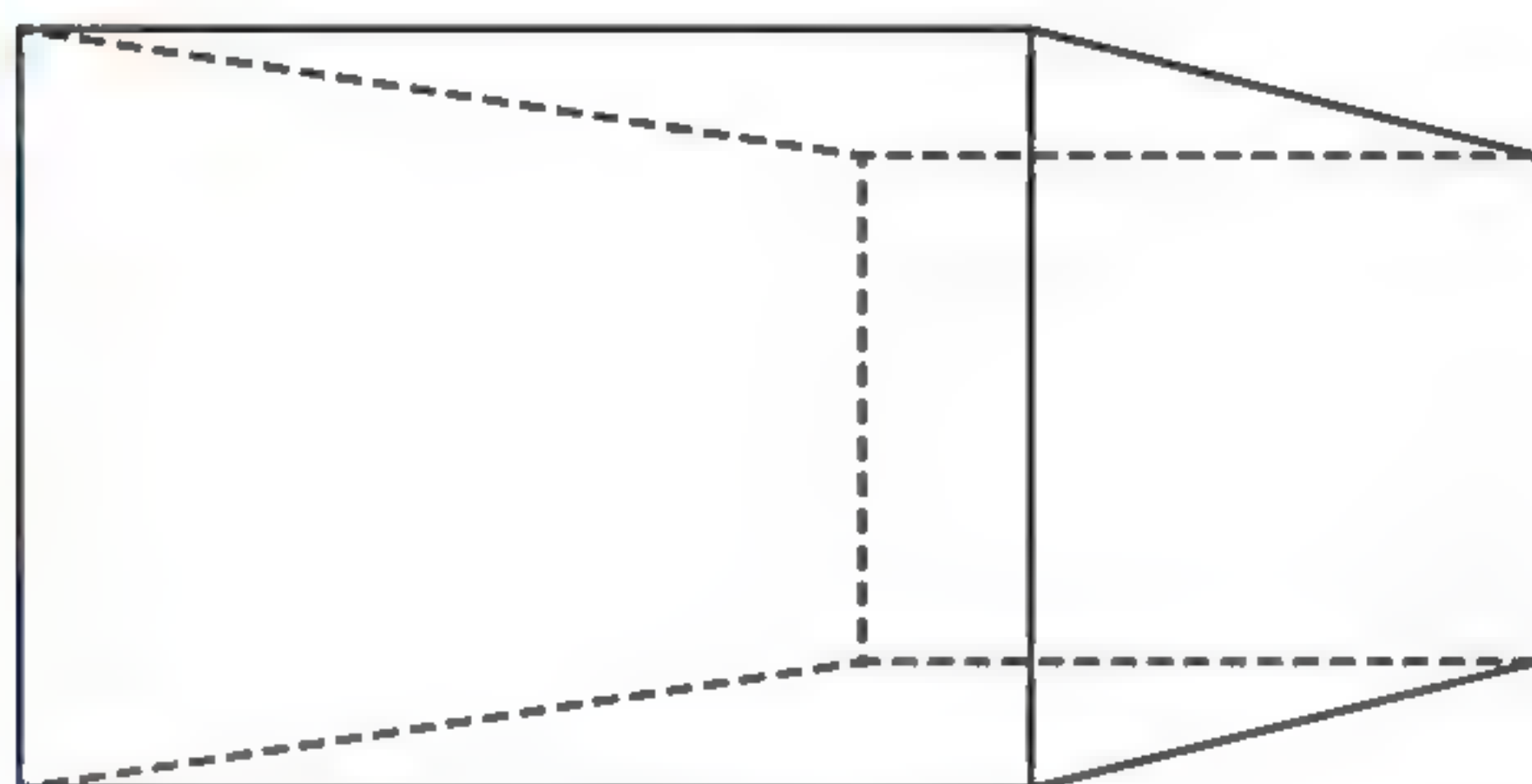
scherm



blz 119

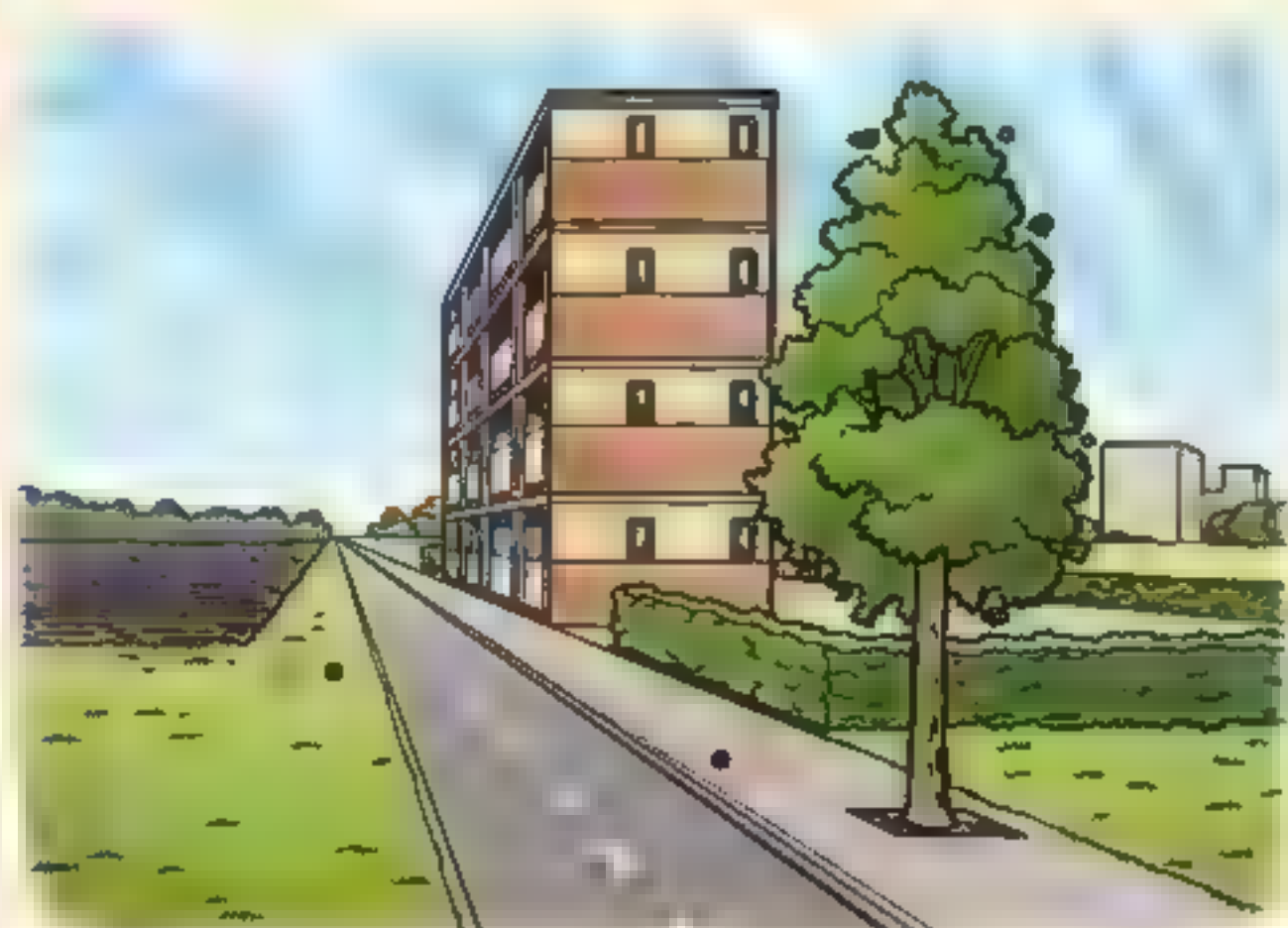


blz 119



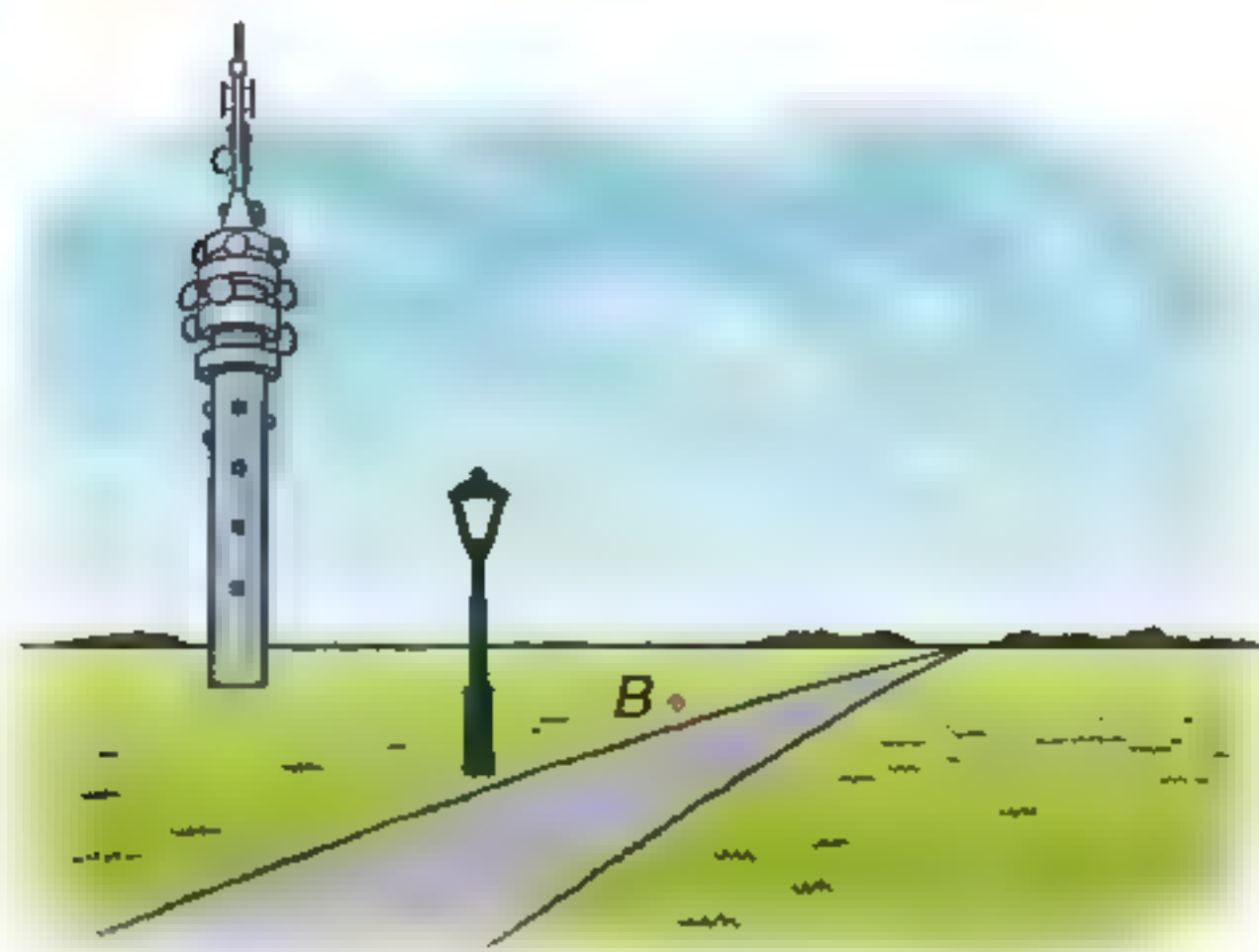
blz 121

Hoogte





blz 121



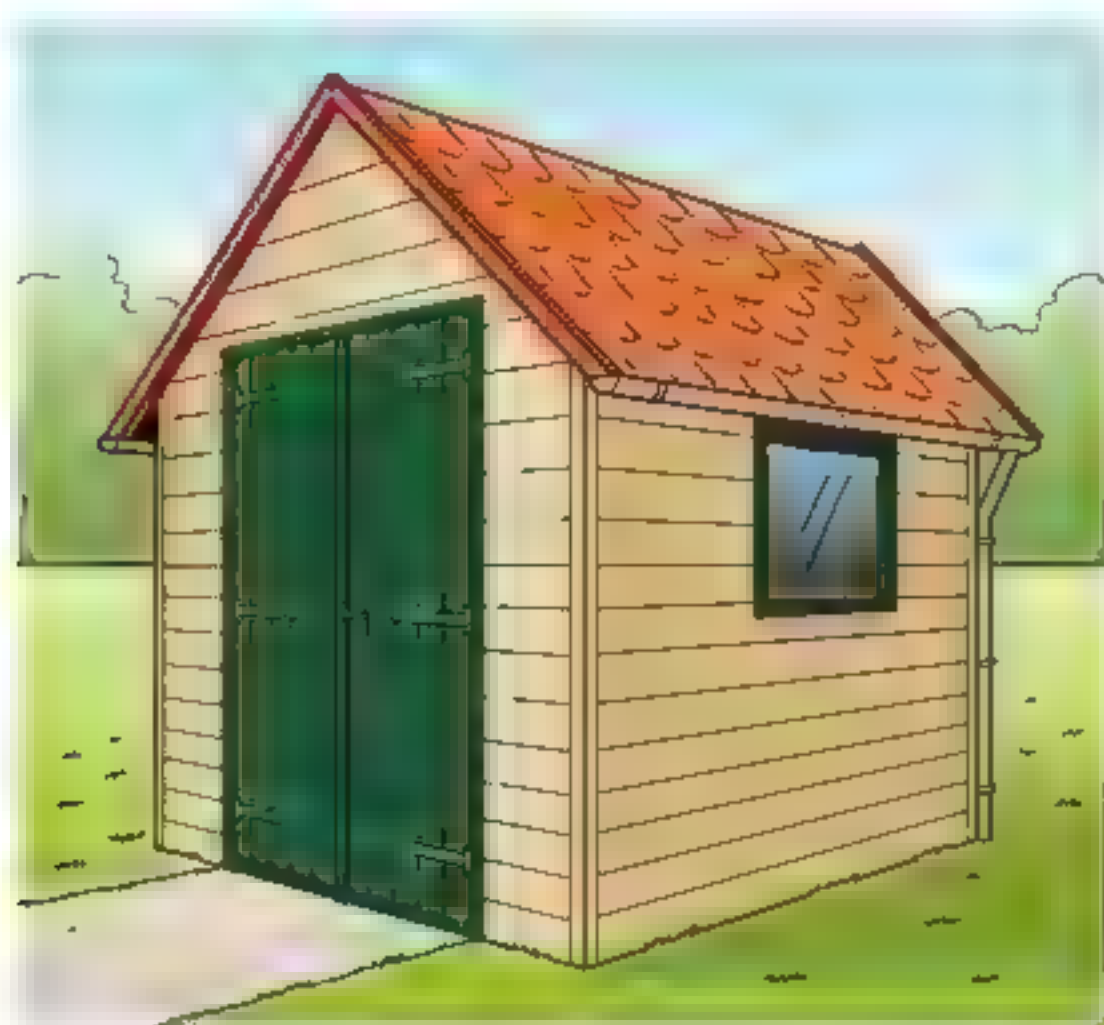
blz 122



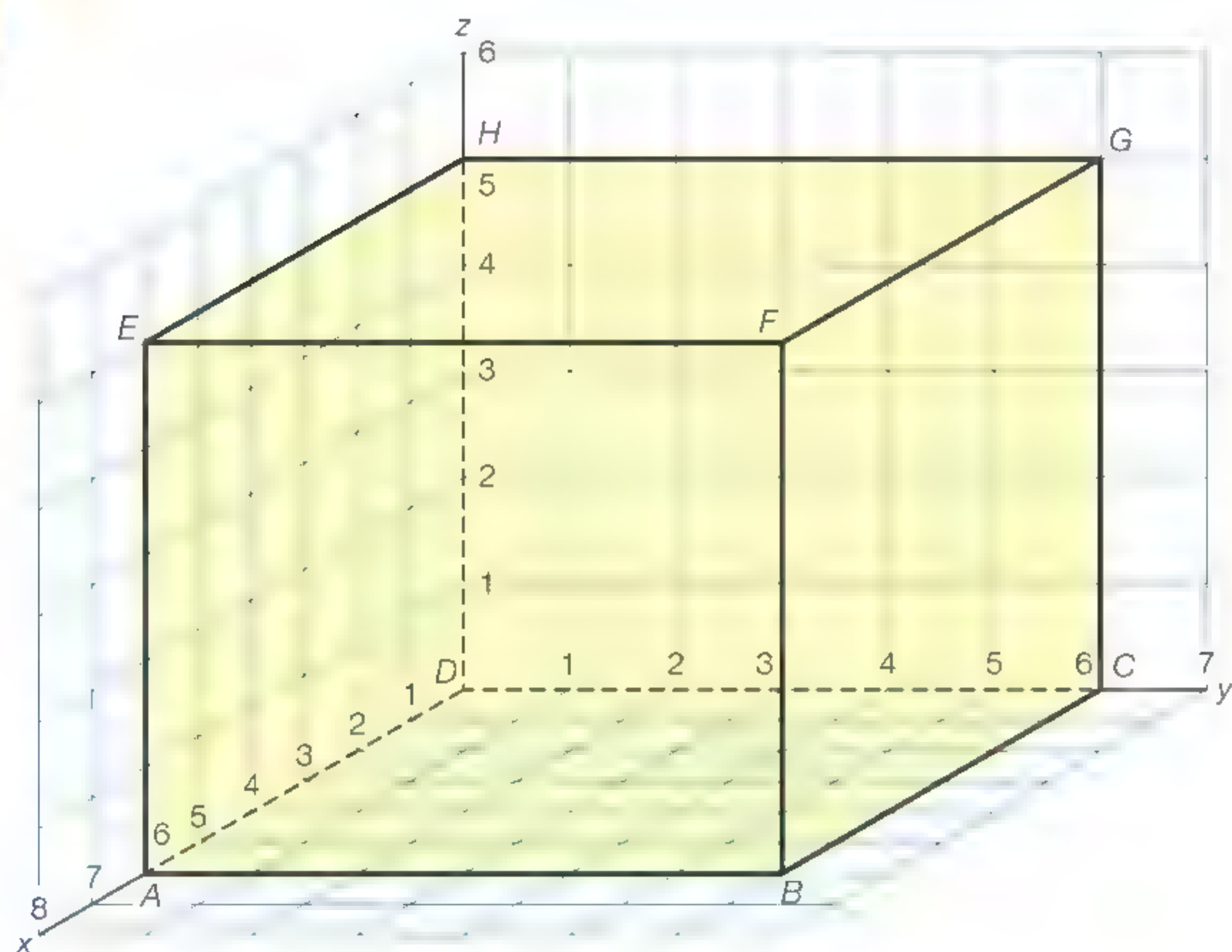
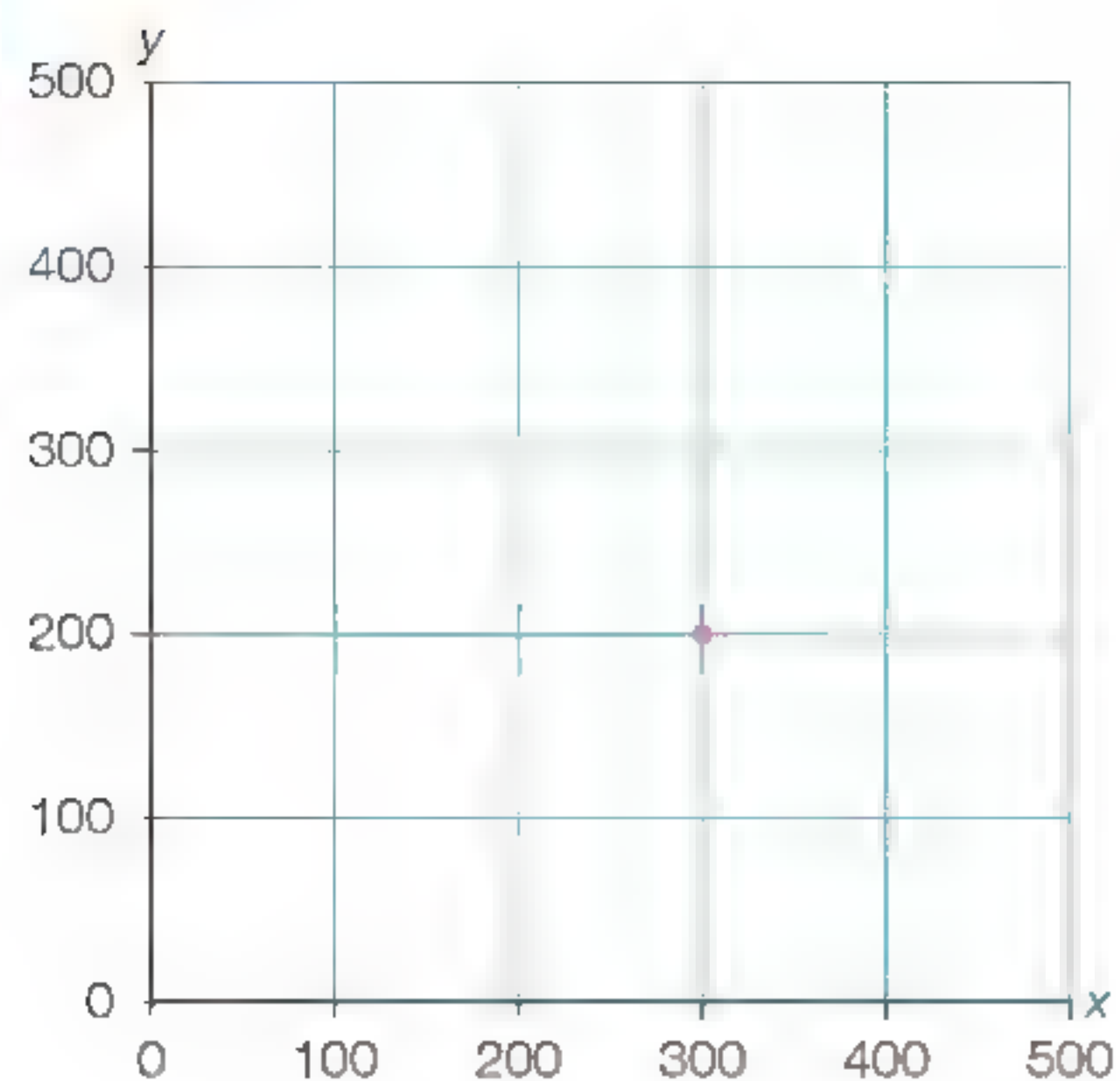
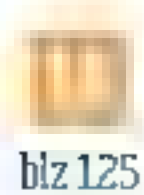
blz 122

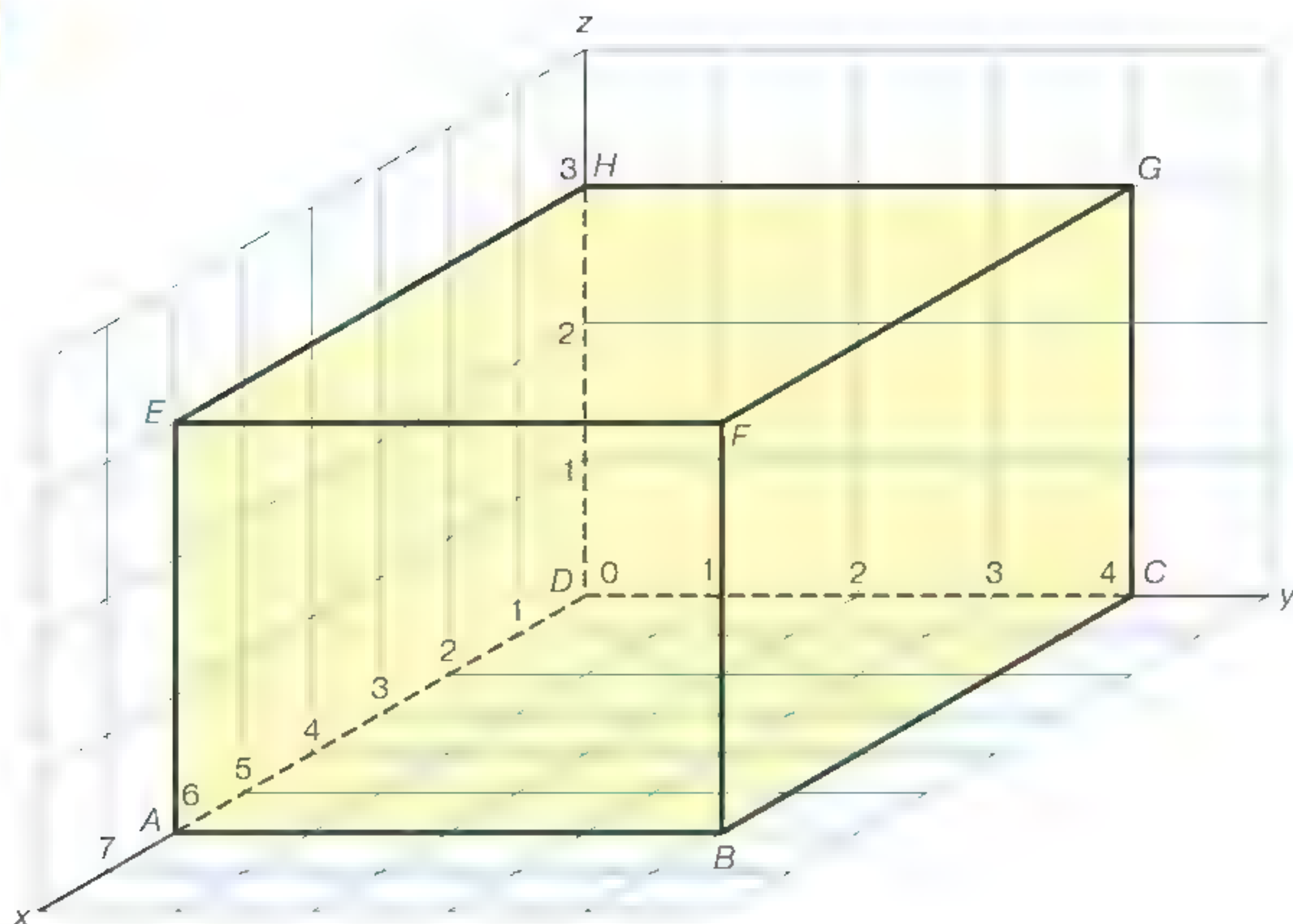


blz 123



3.2 Coördinaten in de ruimte

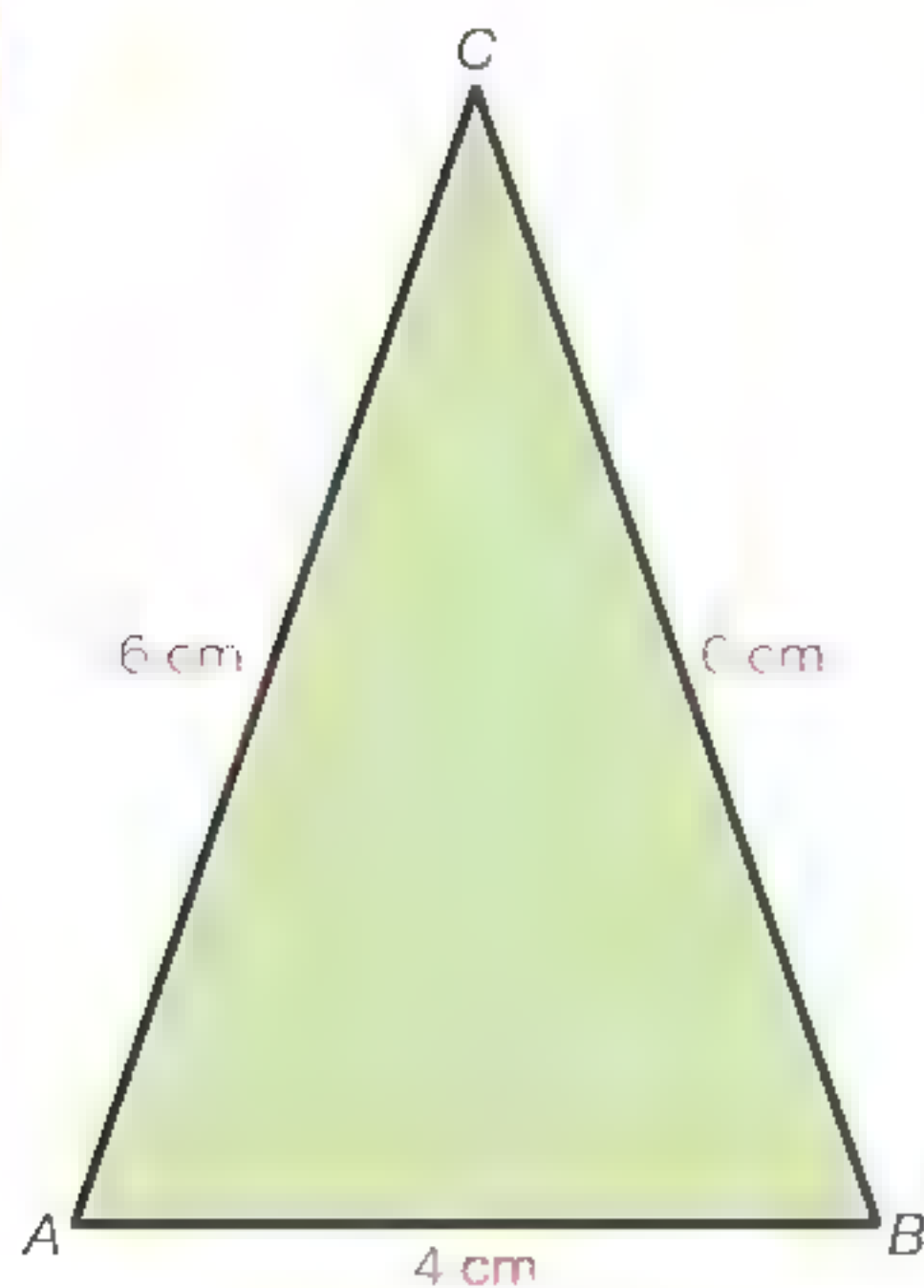
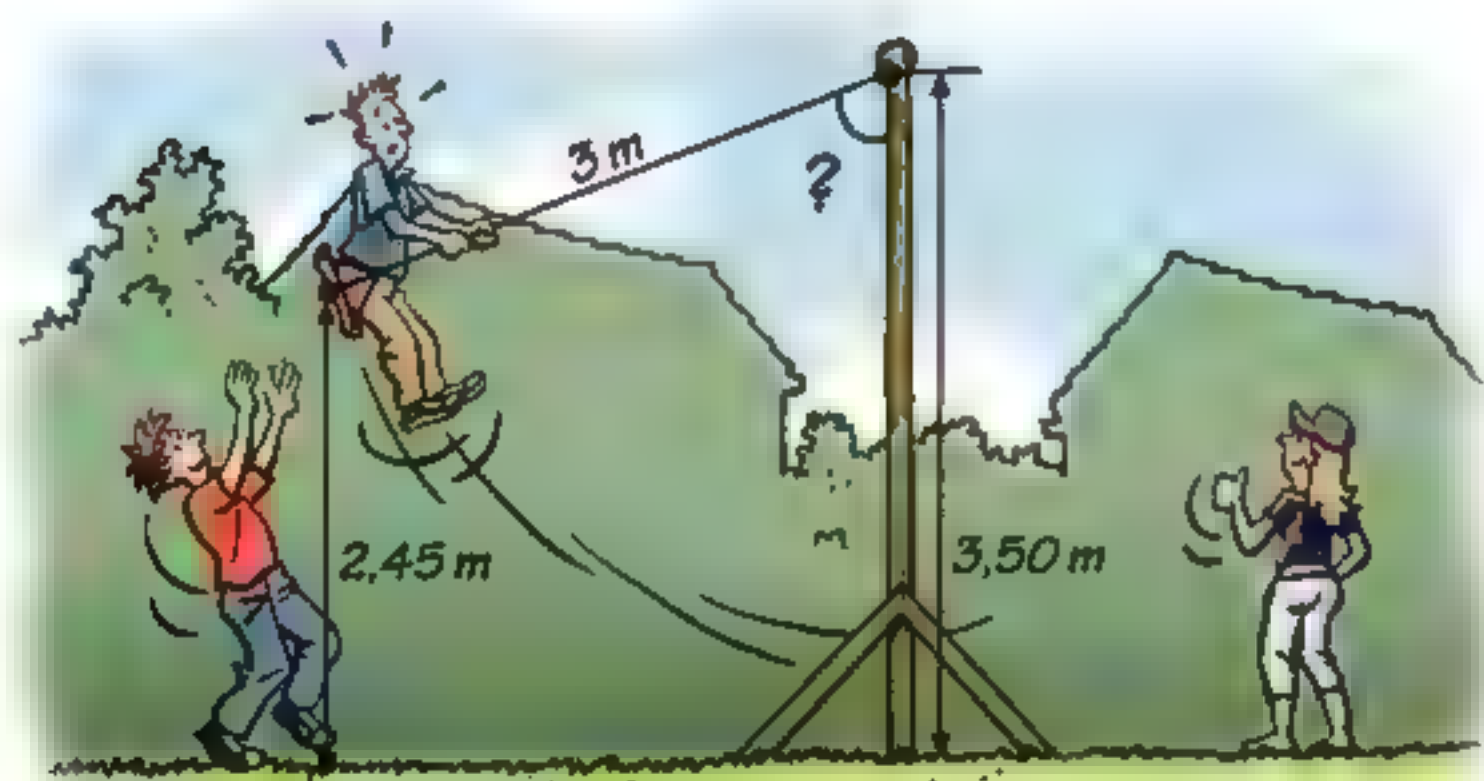




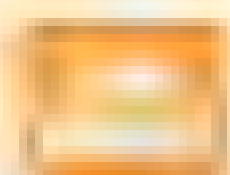
3.3 Zijden berekenen in een driehoek

$\triangle ABC$	$AB = \dots$	$BC = \dots$	$AC = \dots$
\dots			$\times \dots$

3.5 Goniometrie en hoeken

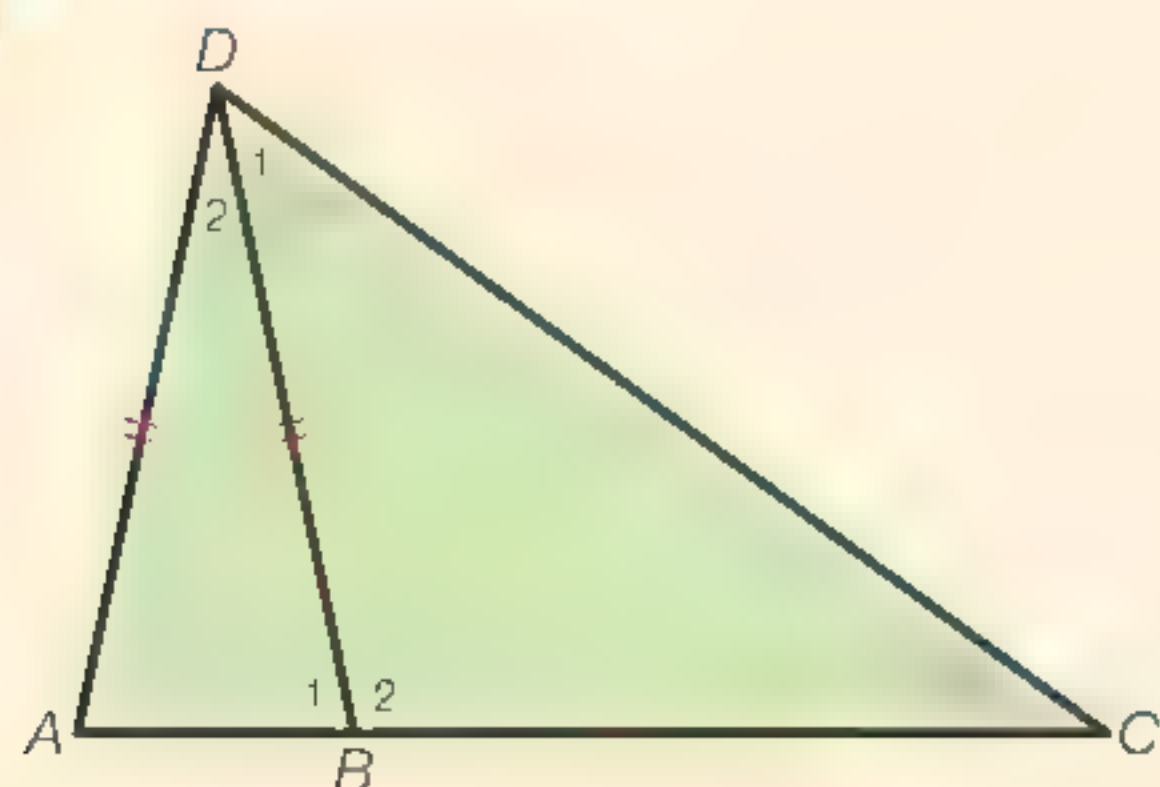


3.6 Hoeken in vlakke figuren



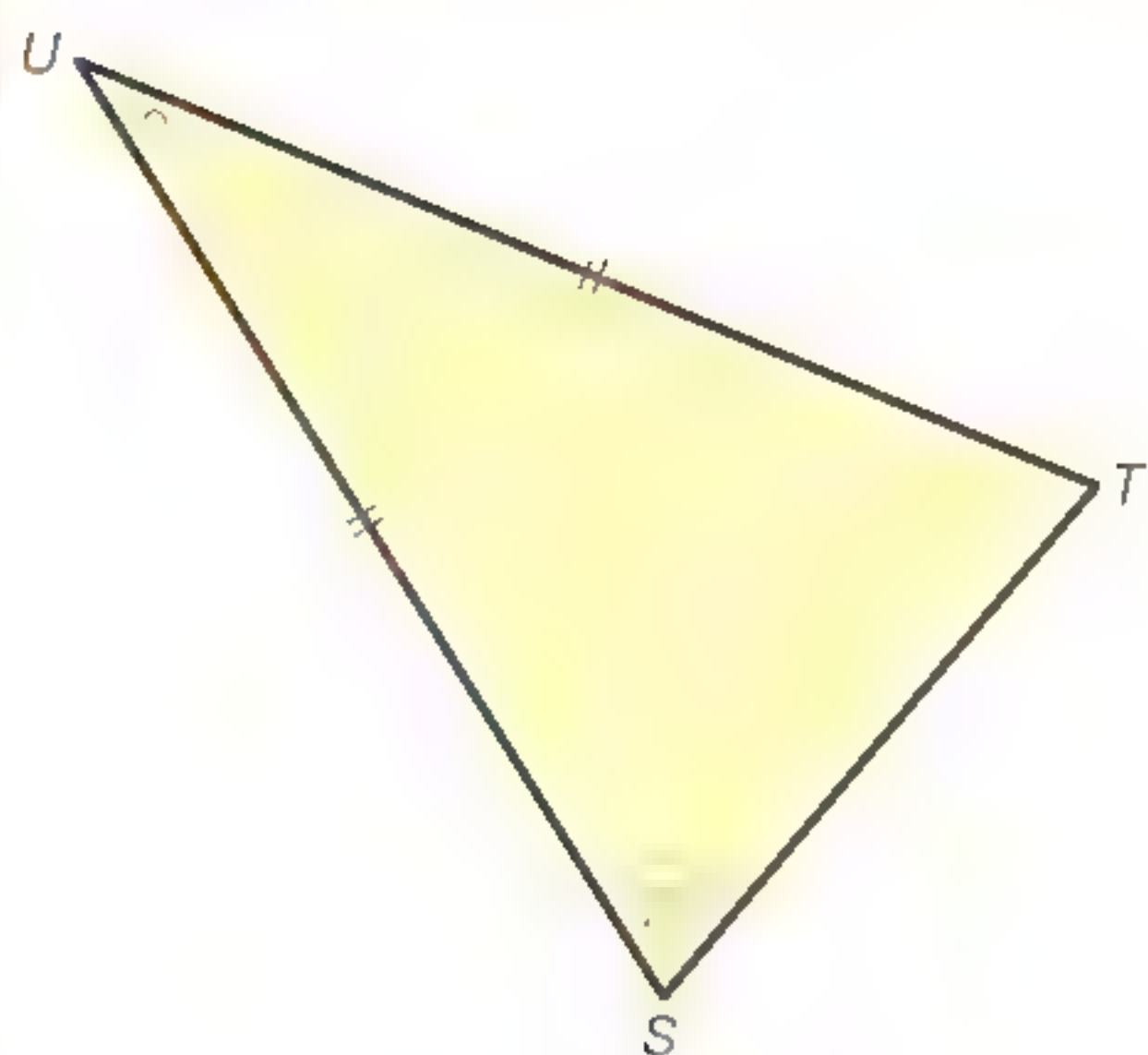
Hoek berekenen

blz 147

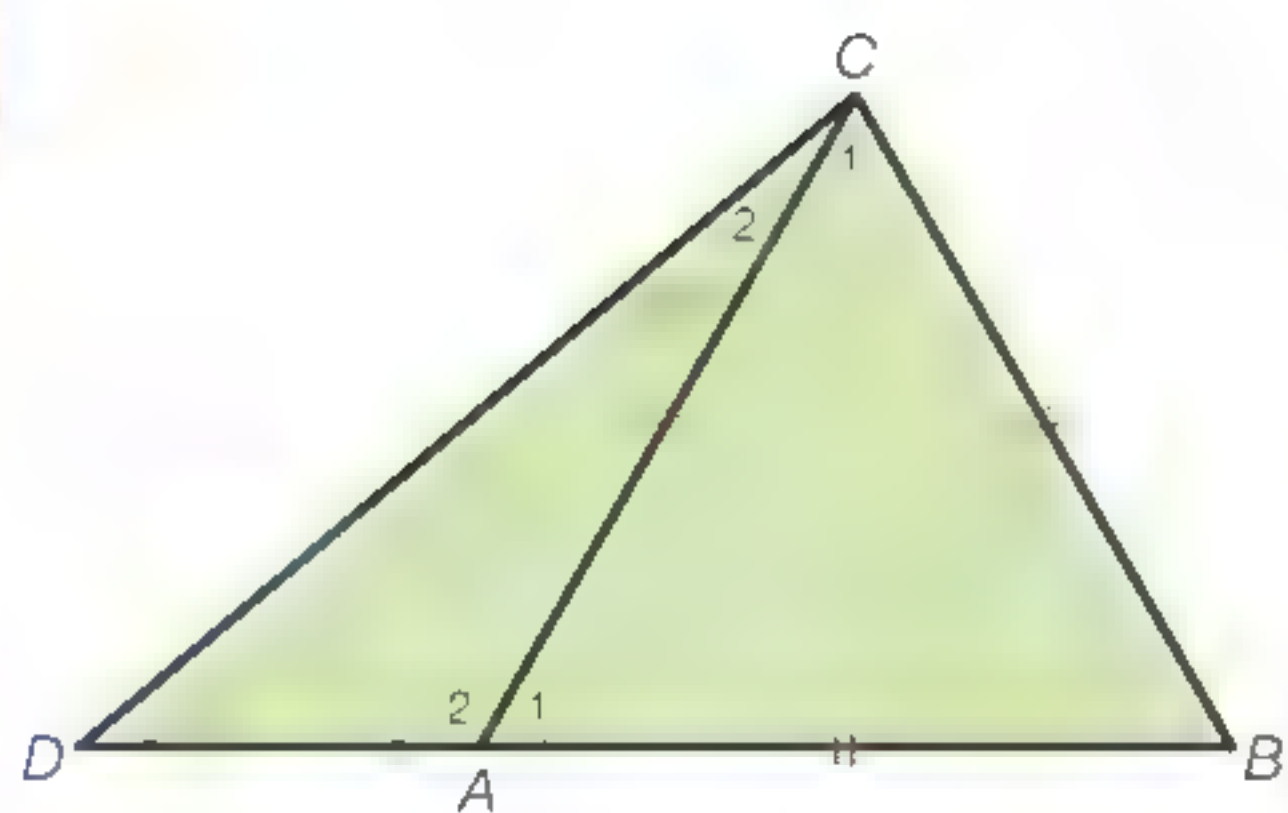


59

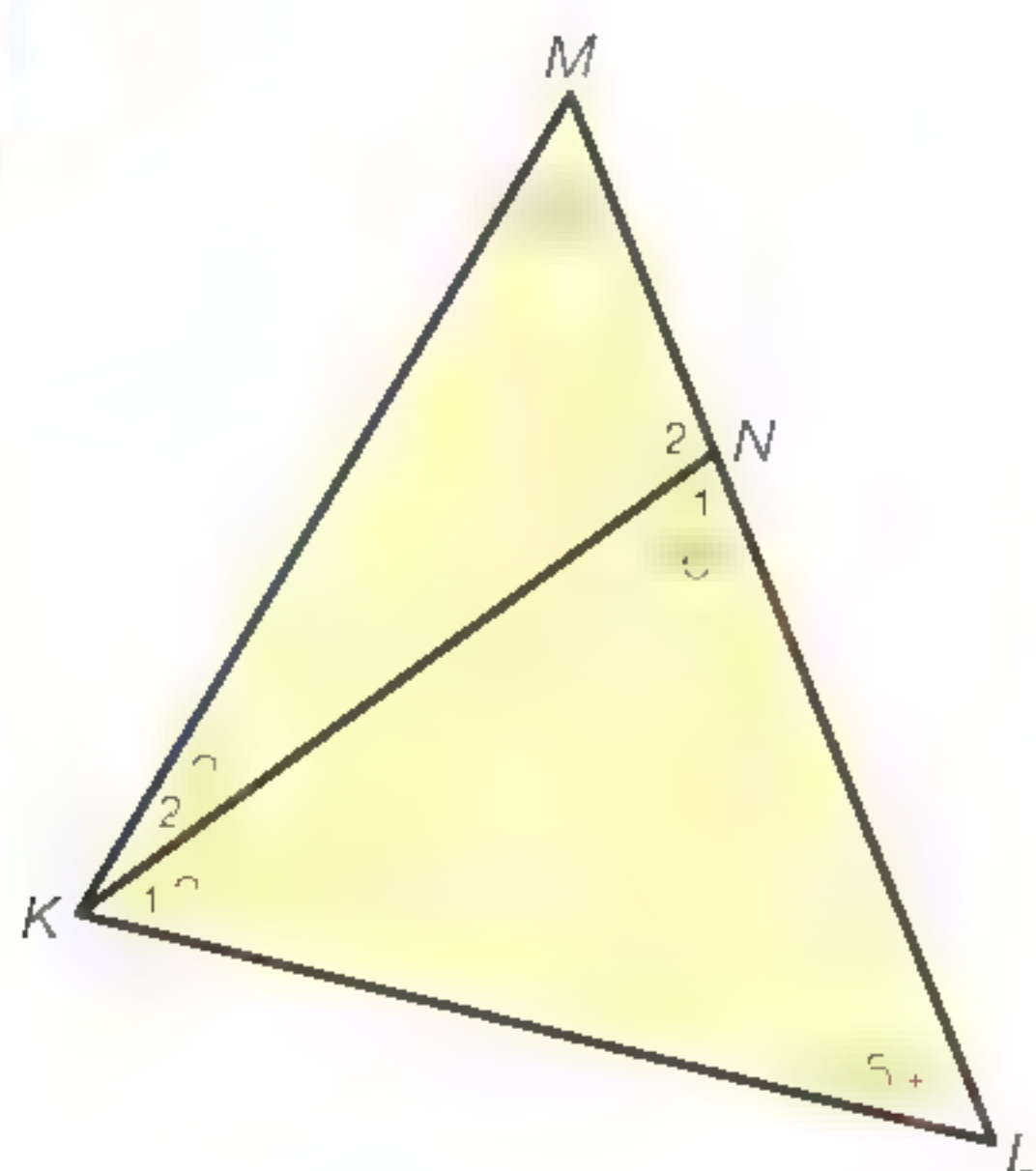
blz 147



blz 148

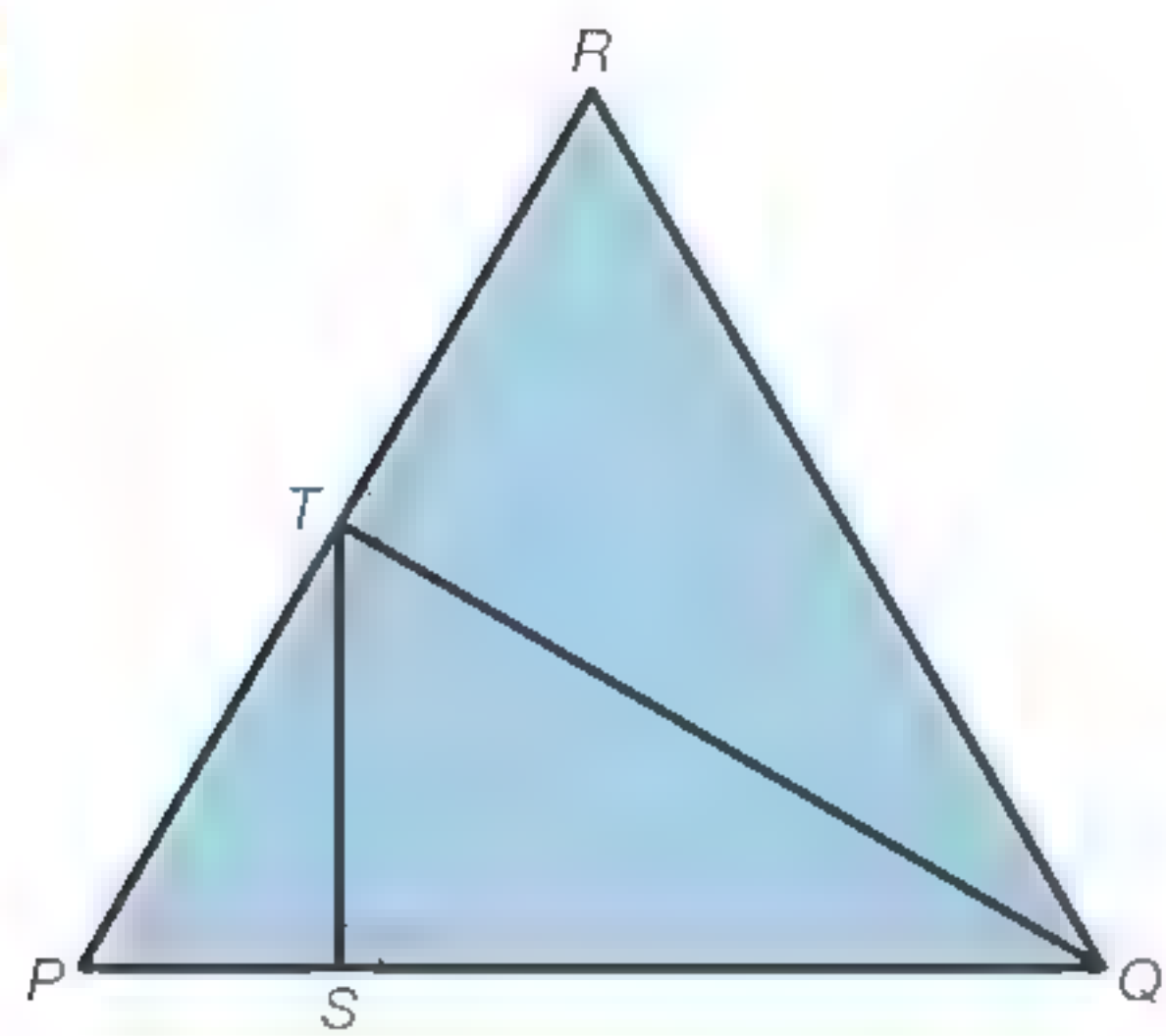


blz 148

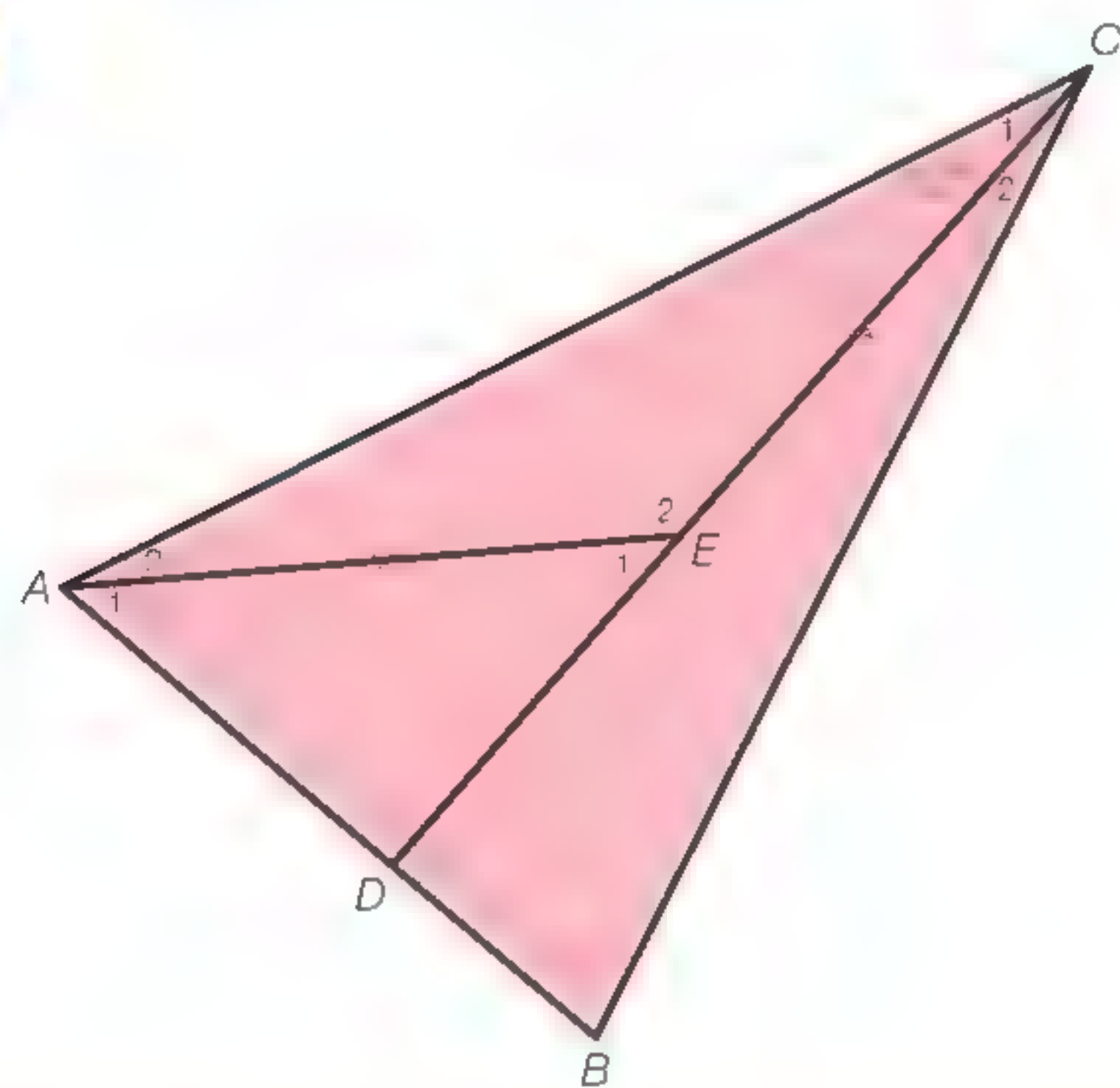




blz 148

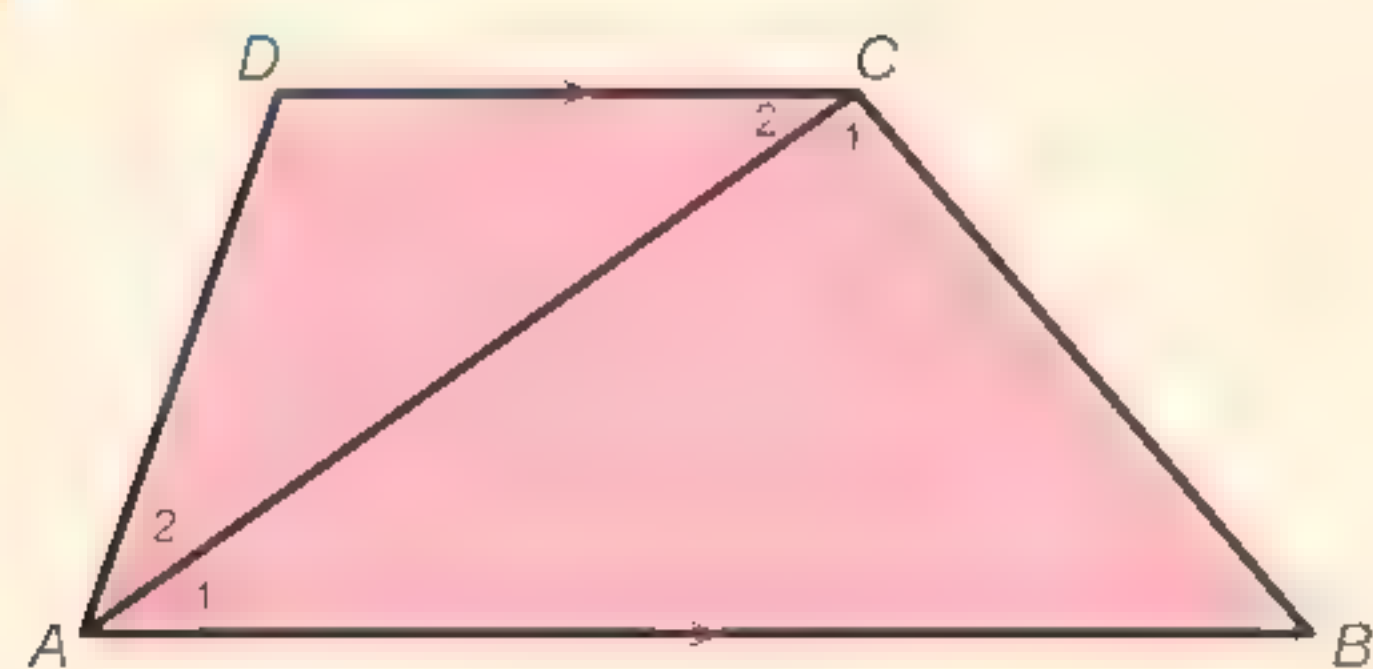


blz 148

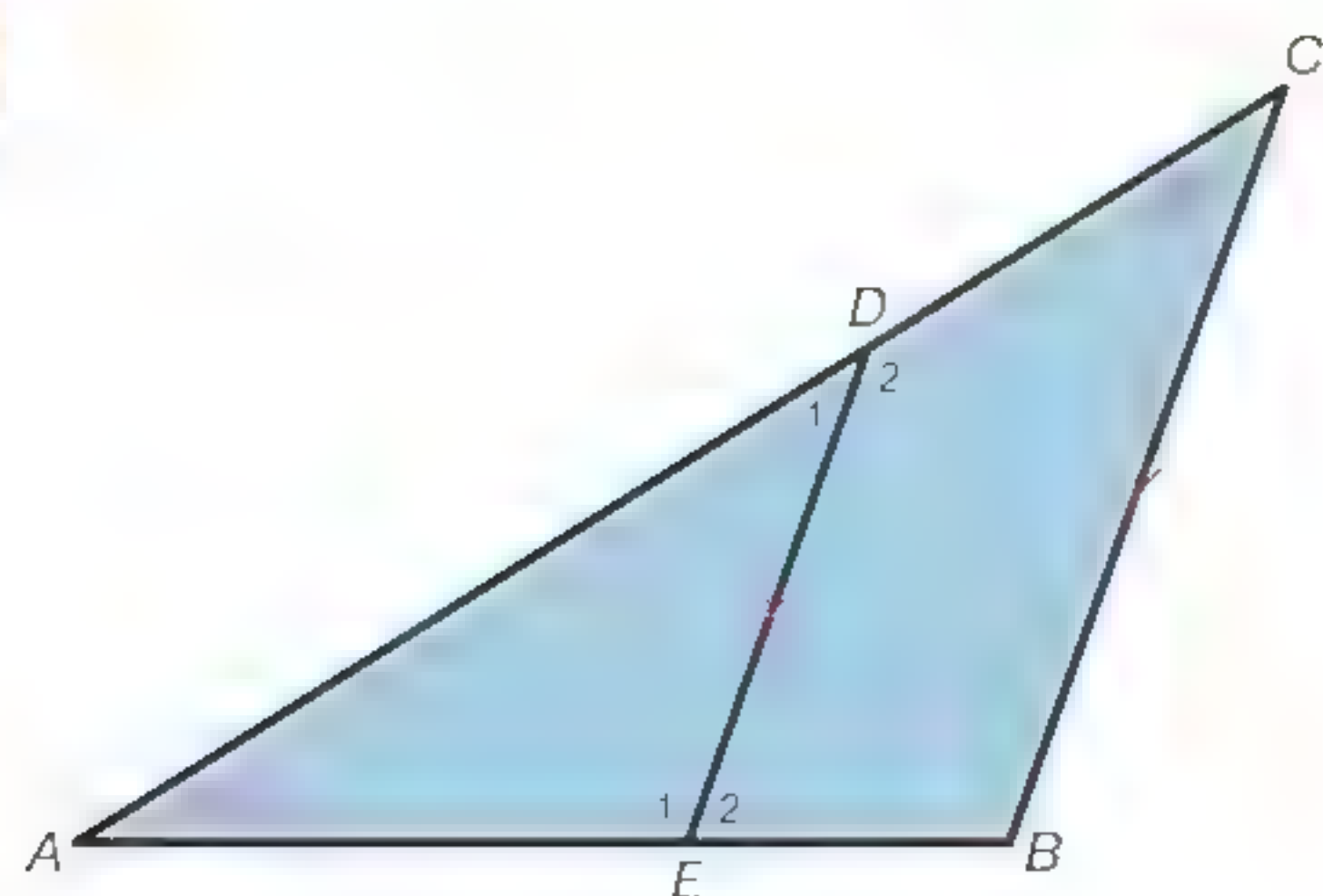


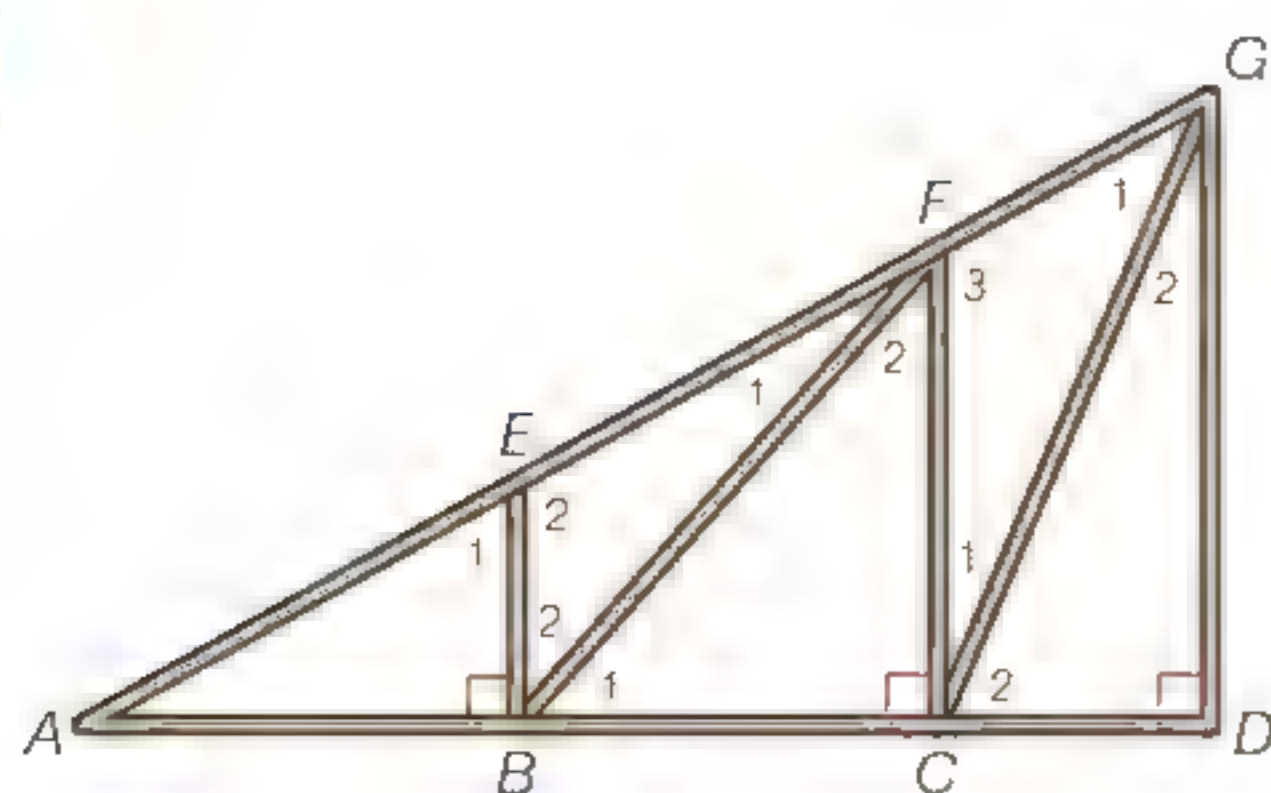
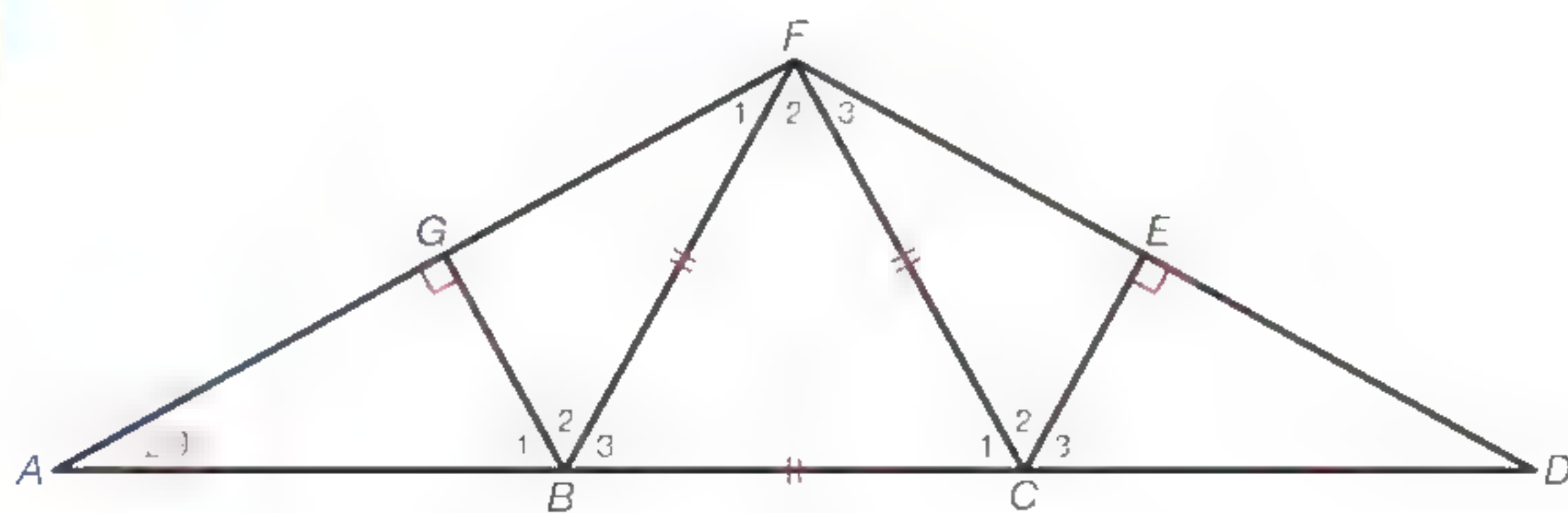
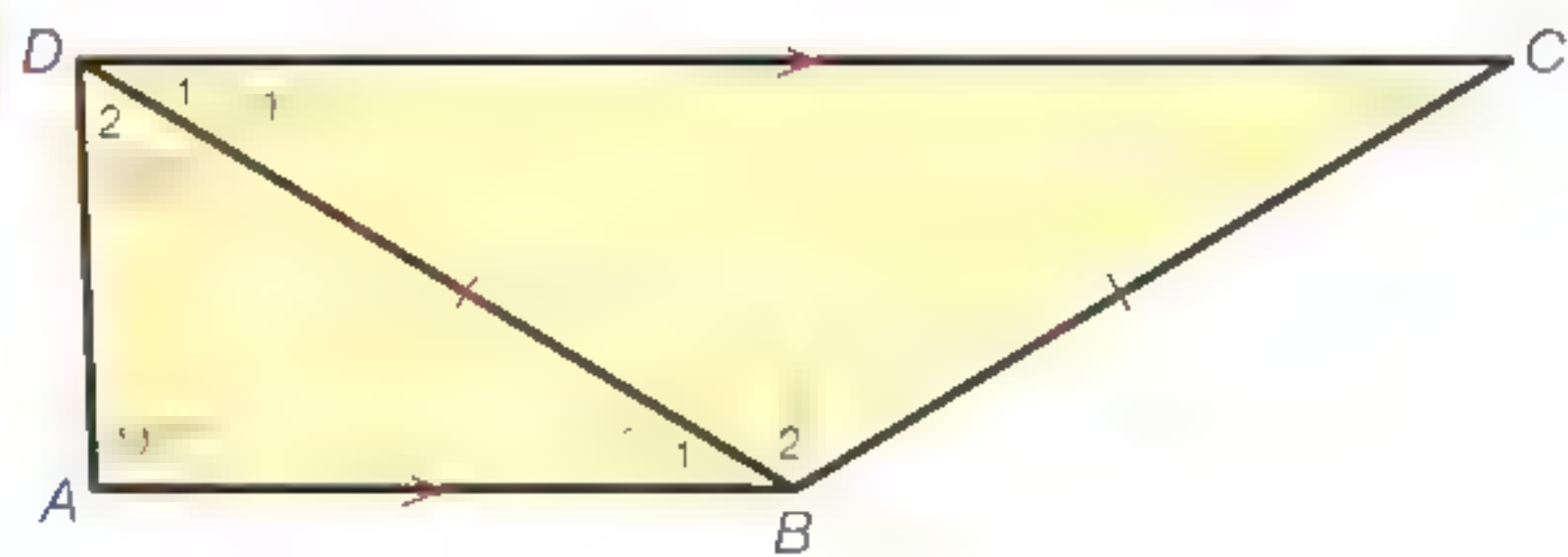
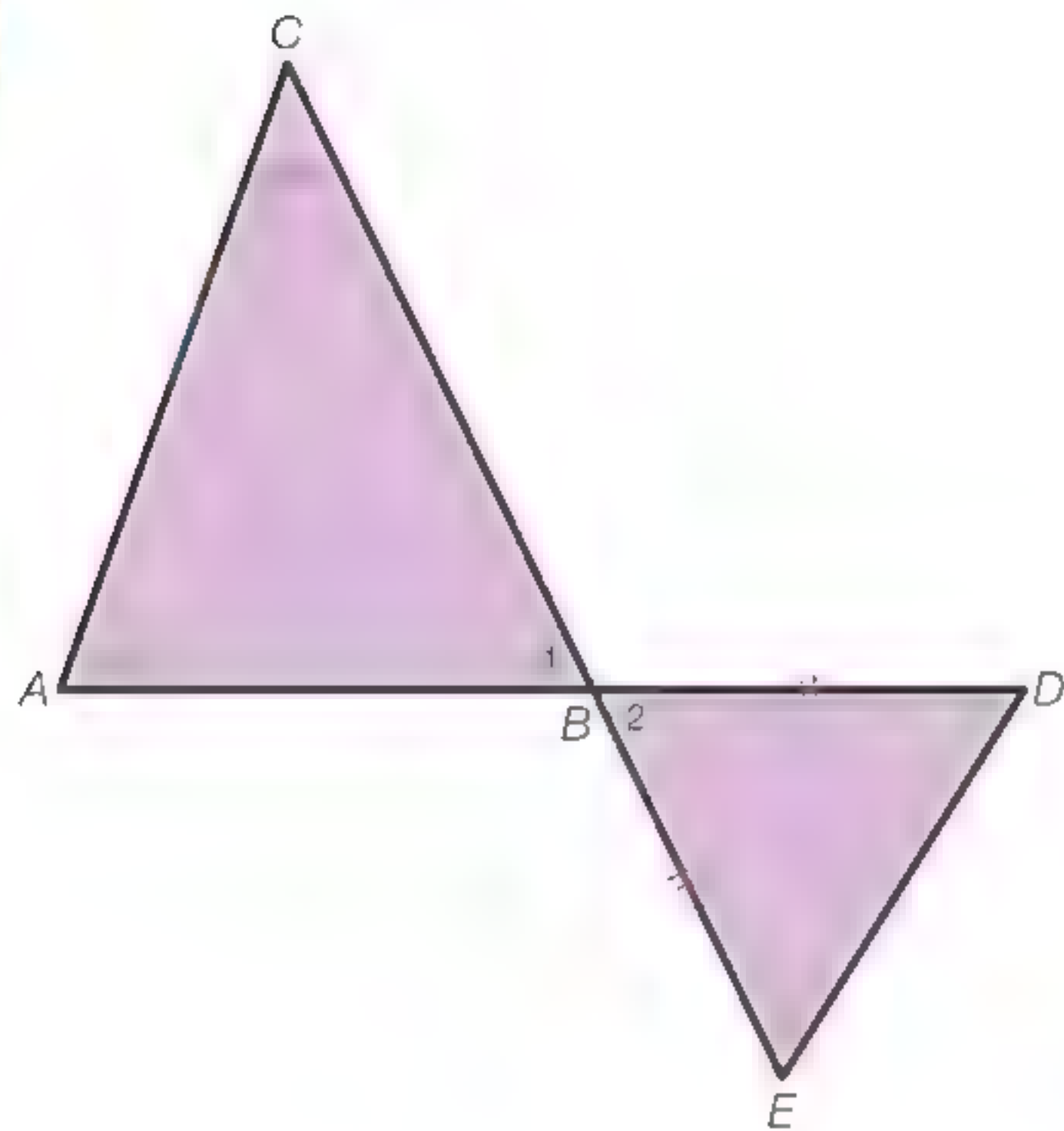
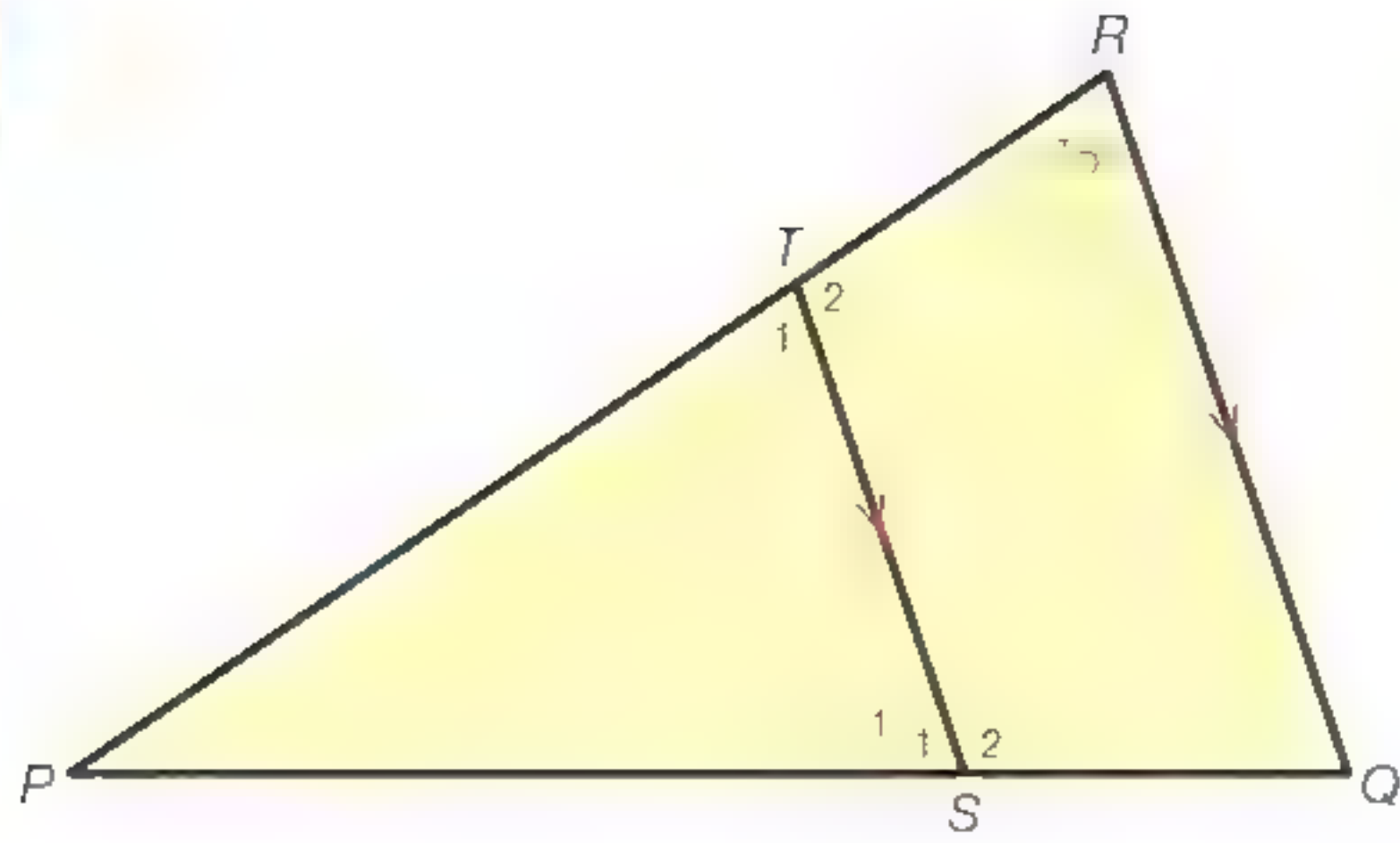
blz 150

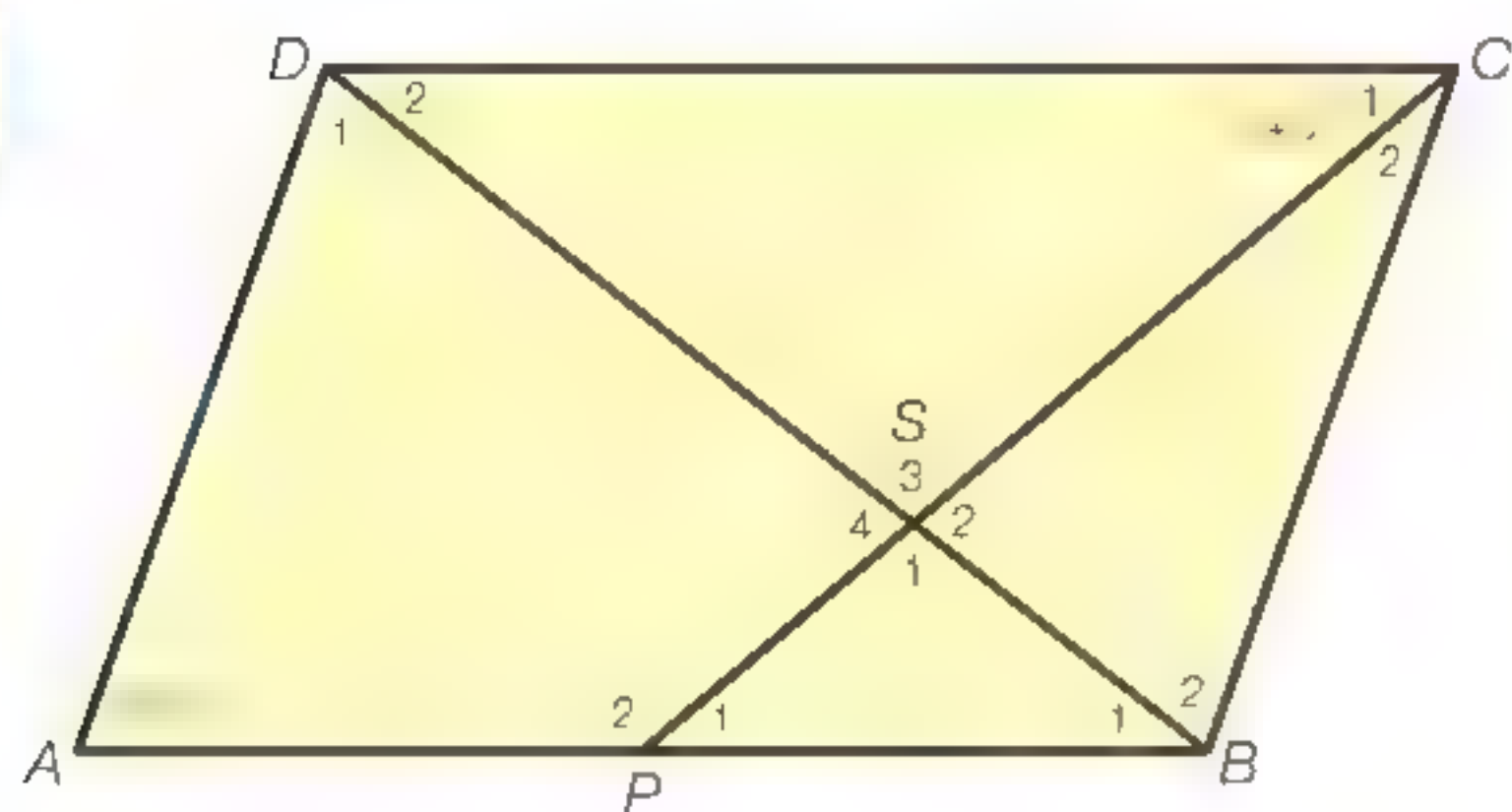
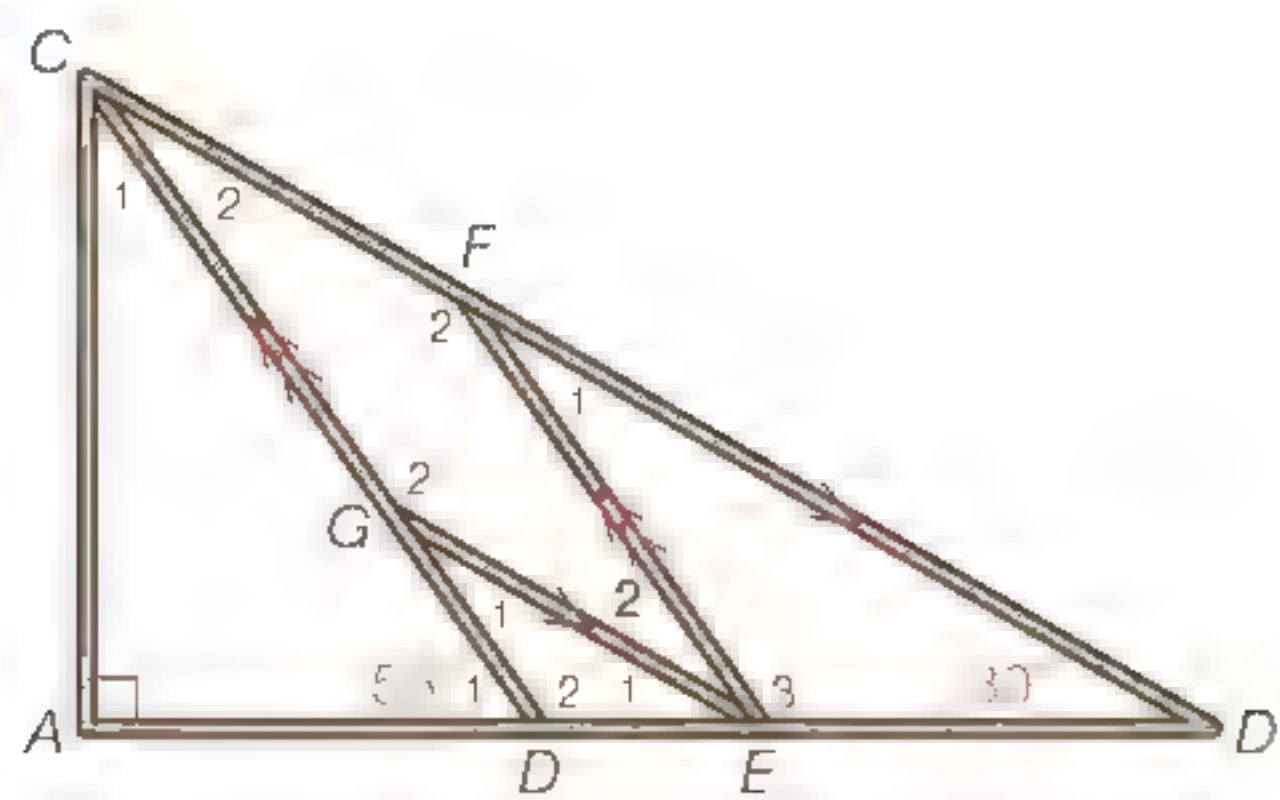
Trapezium



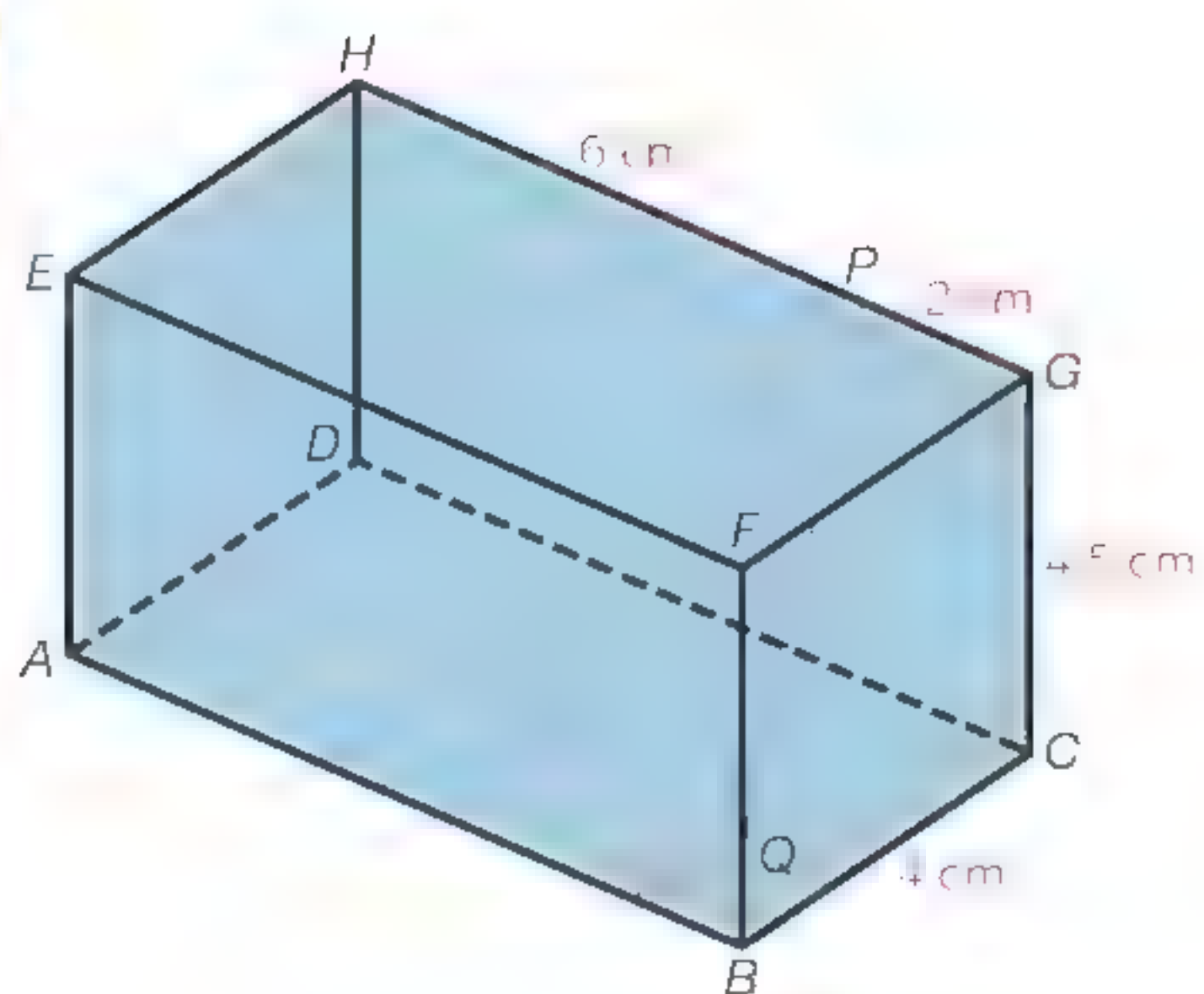
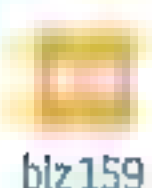
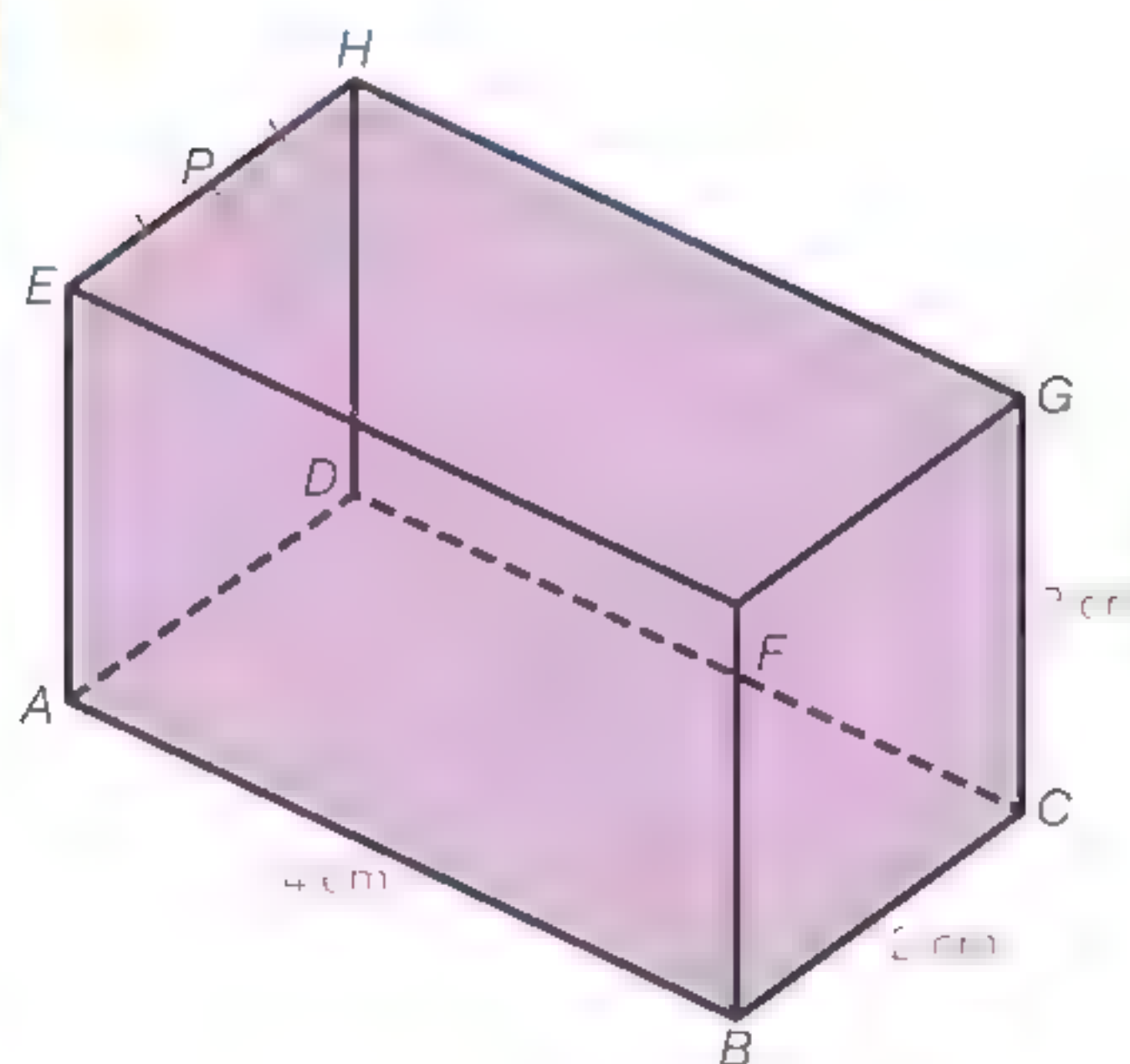
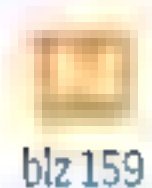
blz 150

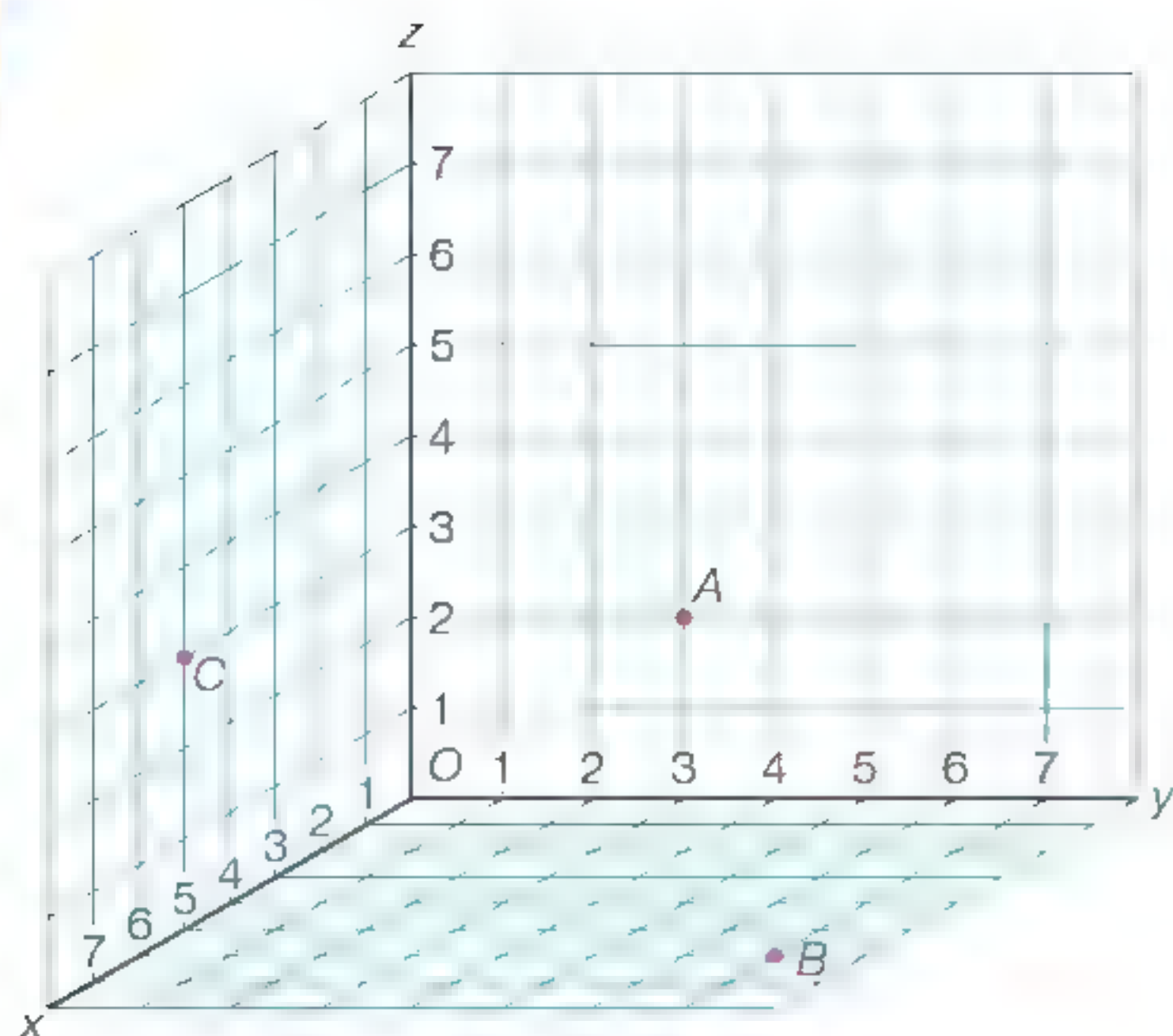




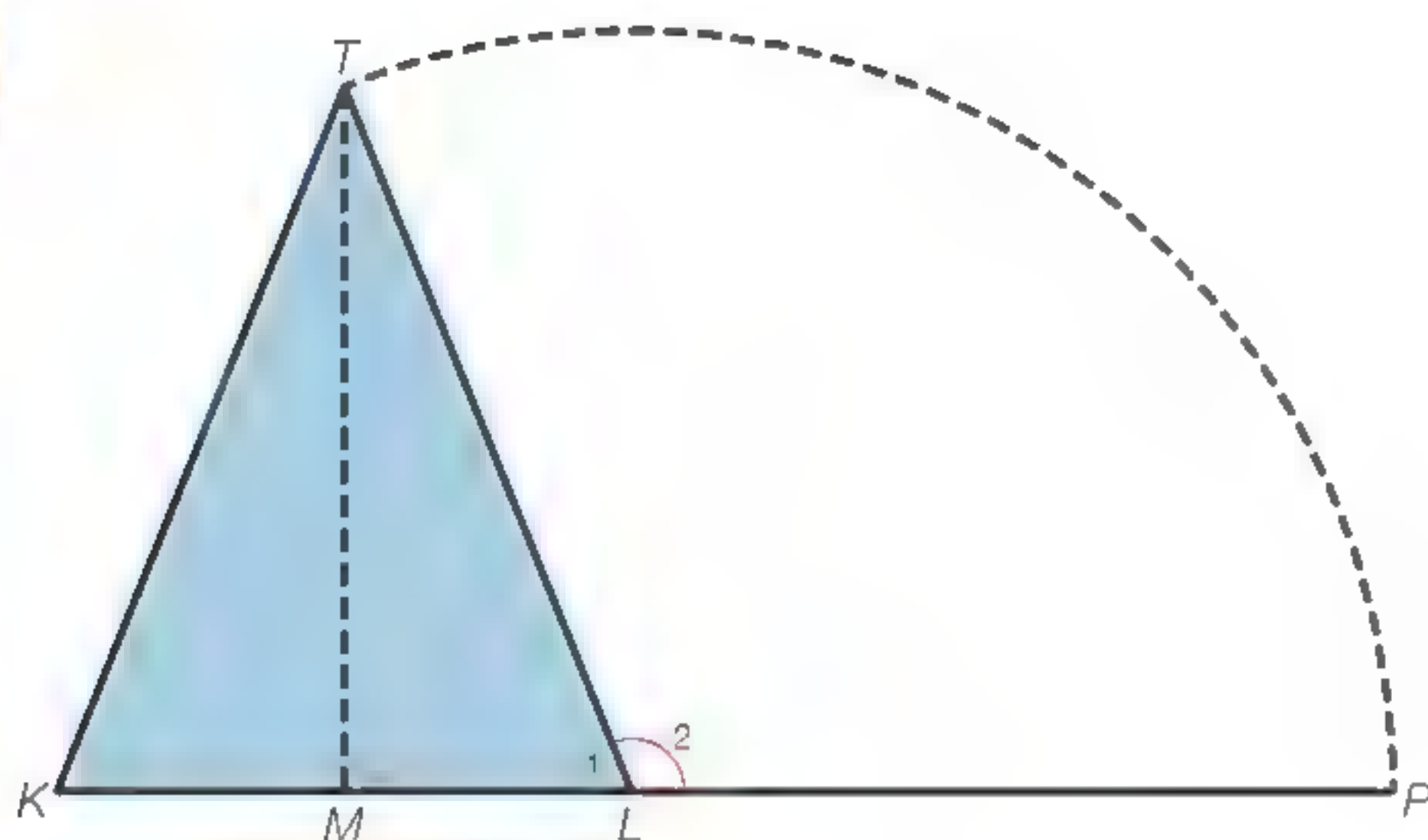


3.7 [VMBO-GT] Berekeningen in de ruimte





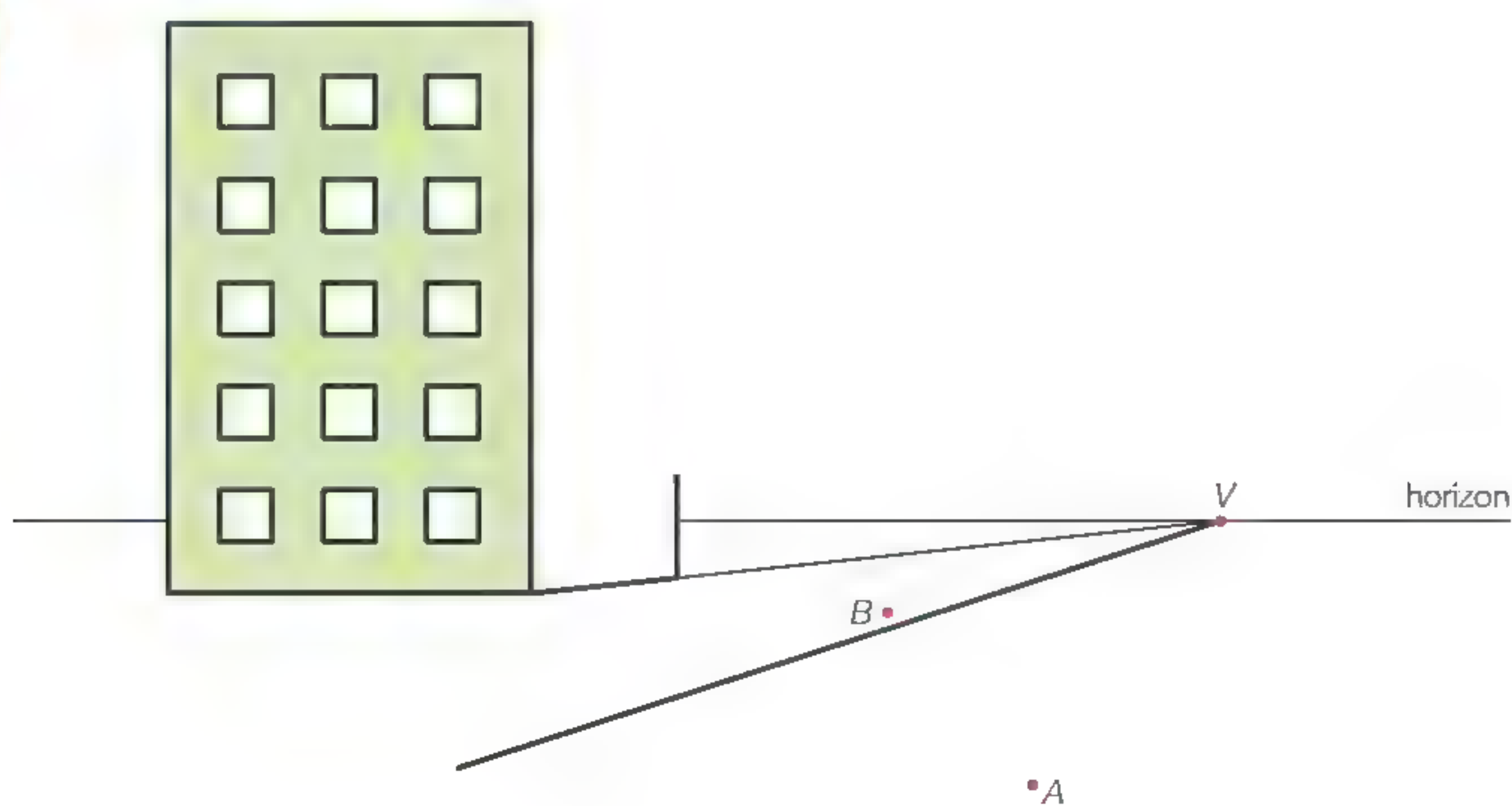
3.8 Trainen op examenniveau

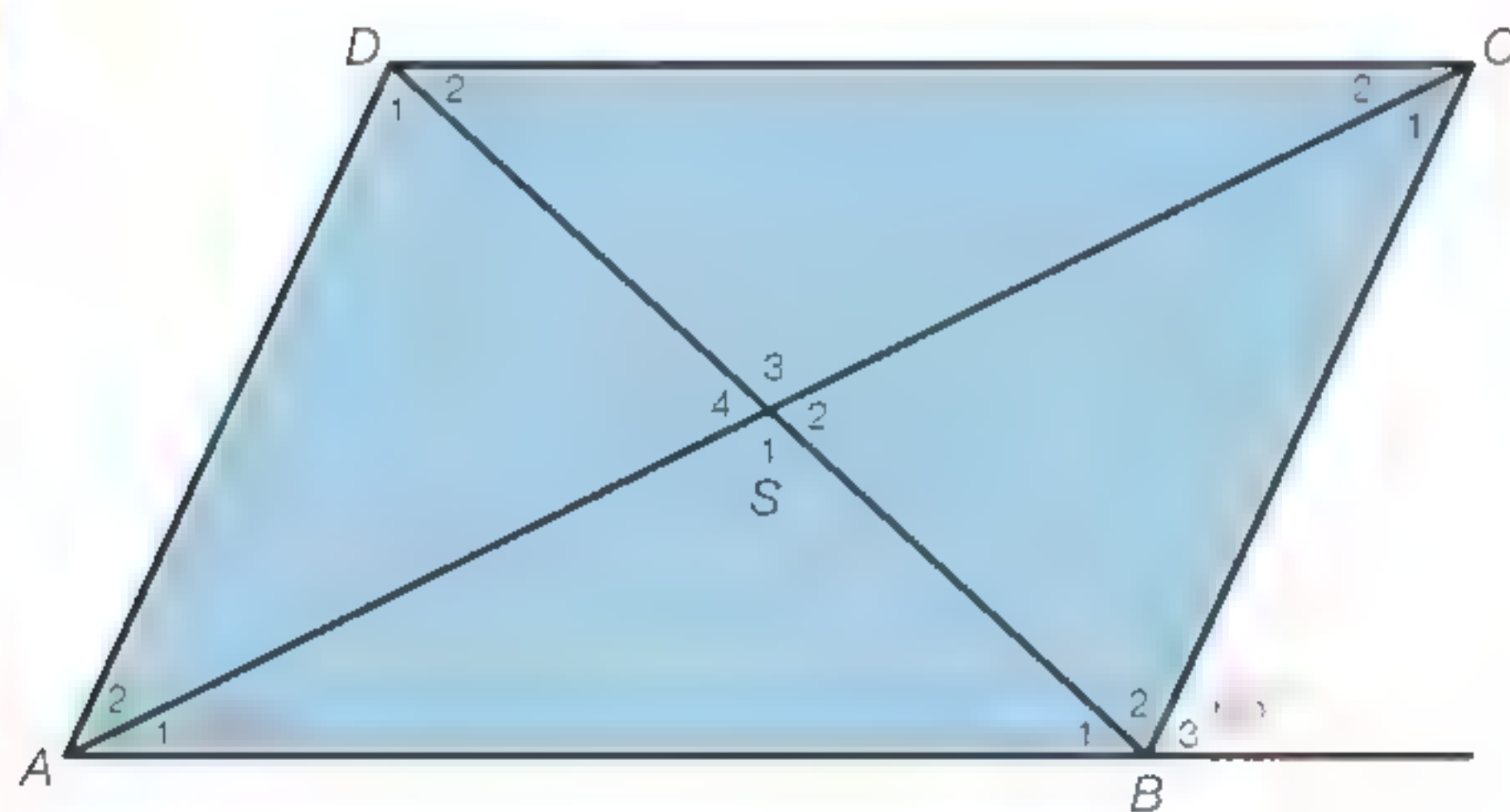
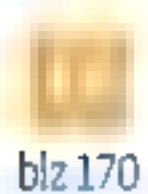
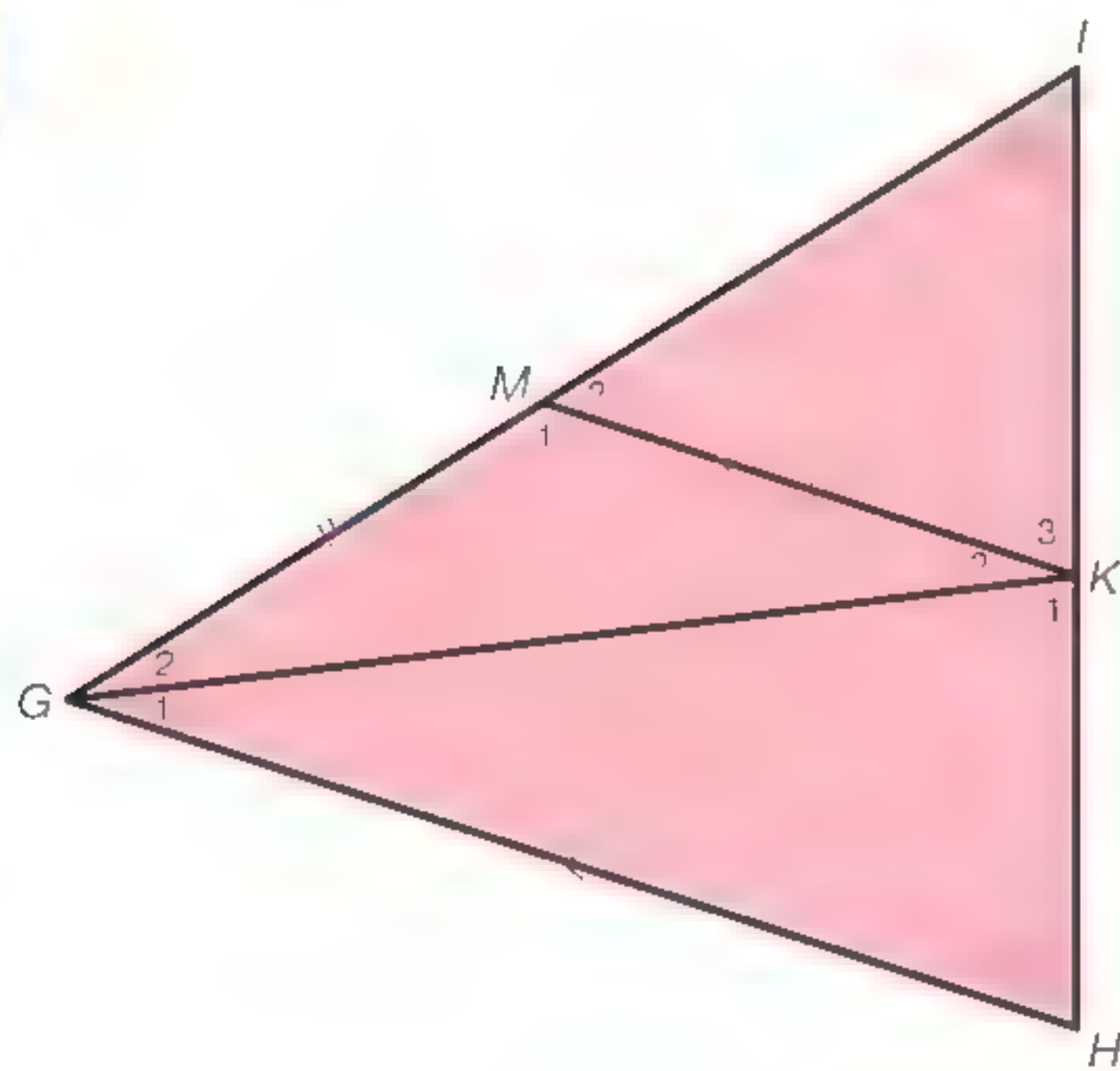
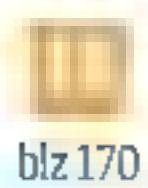
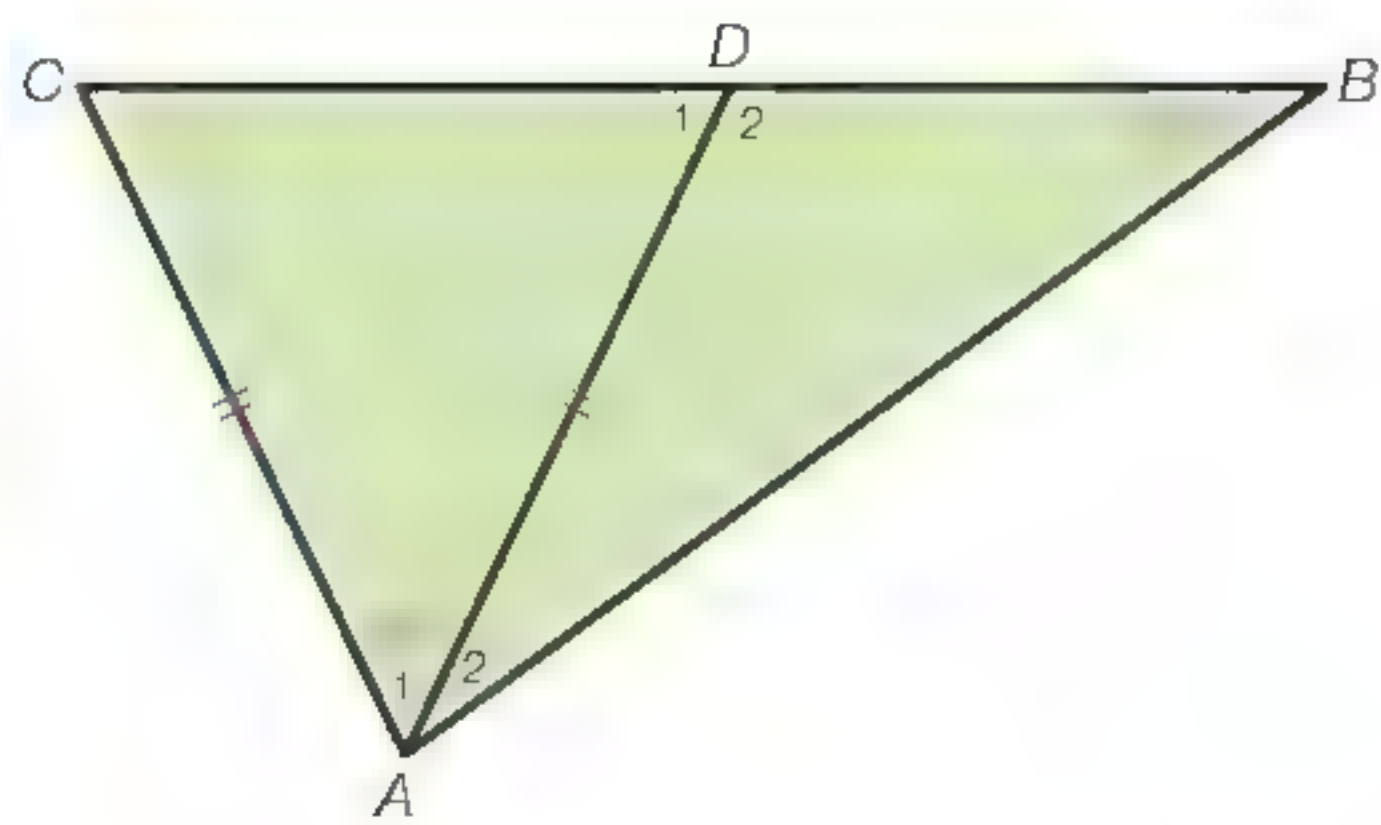


Schaal 1:3

De afstand boven de grond wordt	groter	kleiner
De hoek wordt	groter	kleiner

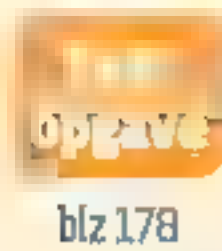
D-toets





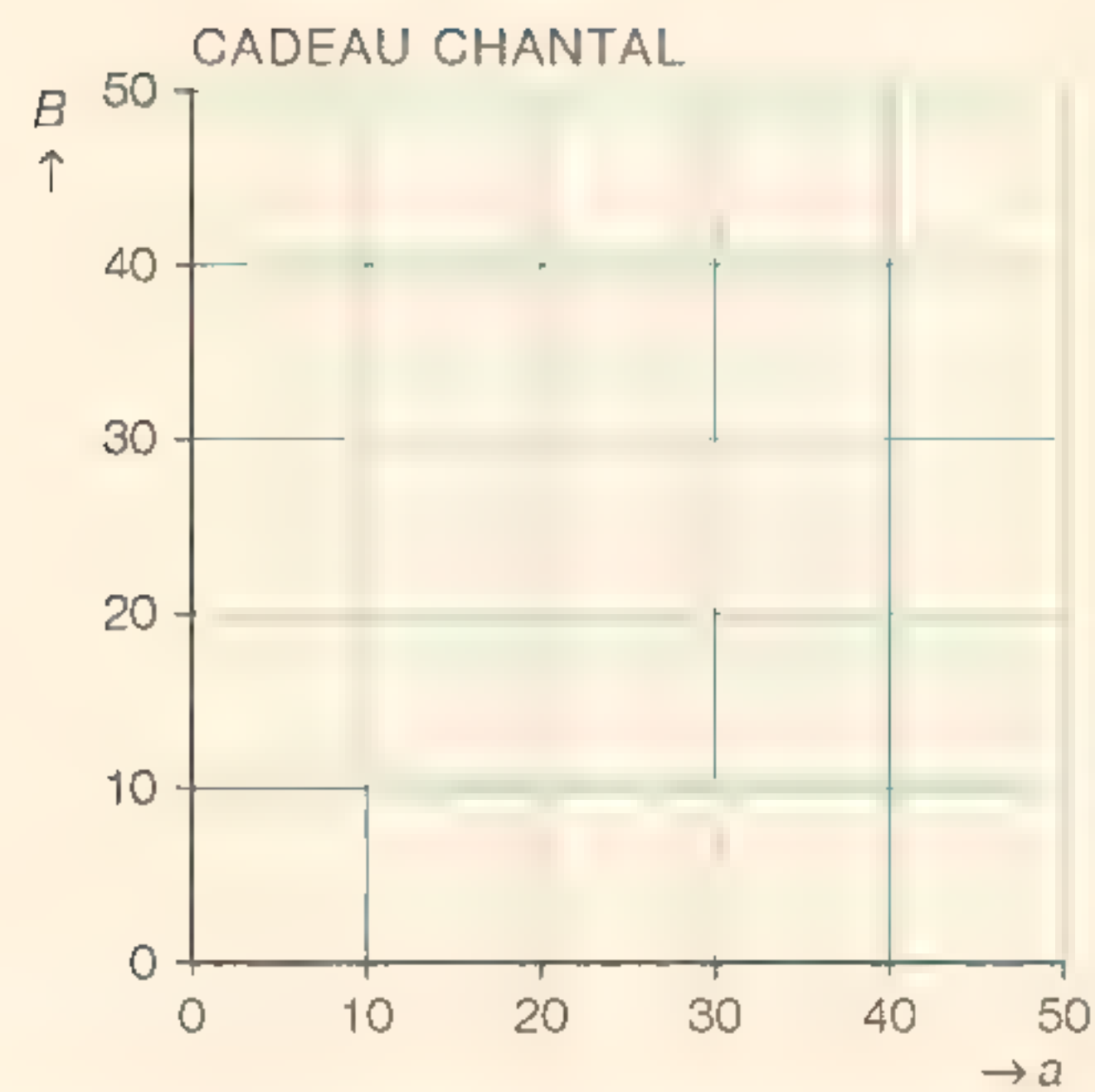
4 Grafieken en vergelijkingen

4.1 Omgekeerd evenredig



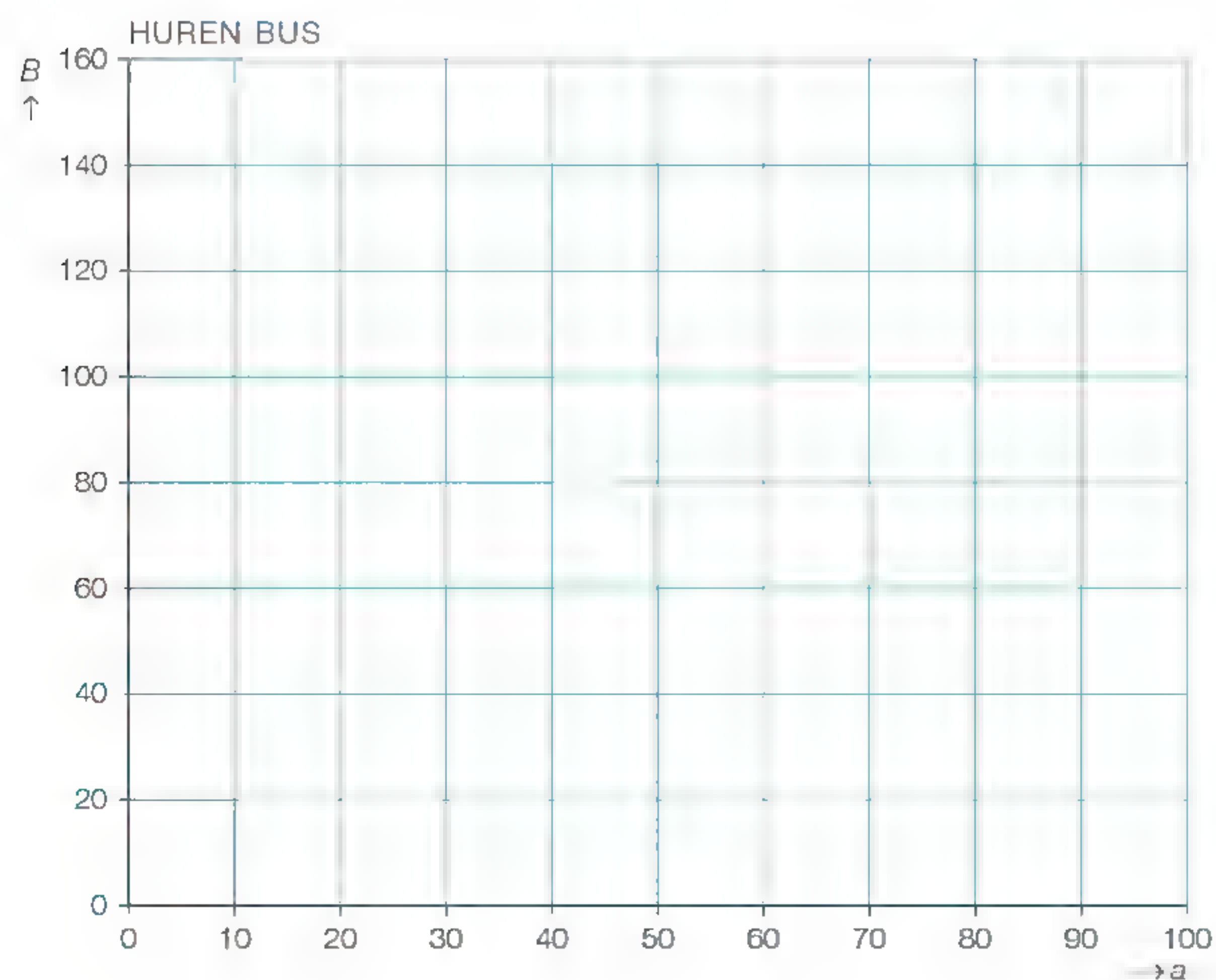
Cadeau kopen

a	1	4	5	10	20	50
B						



HUREN BUS

a	10	20	30	50	60	75	100
B							

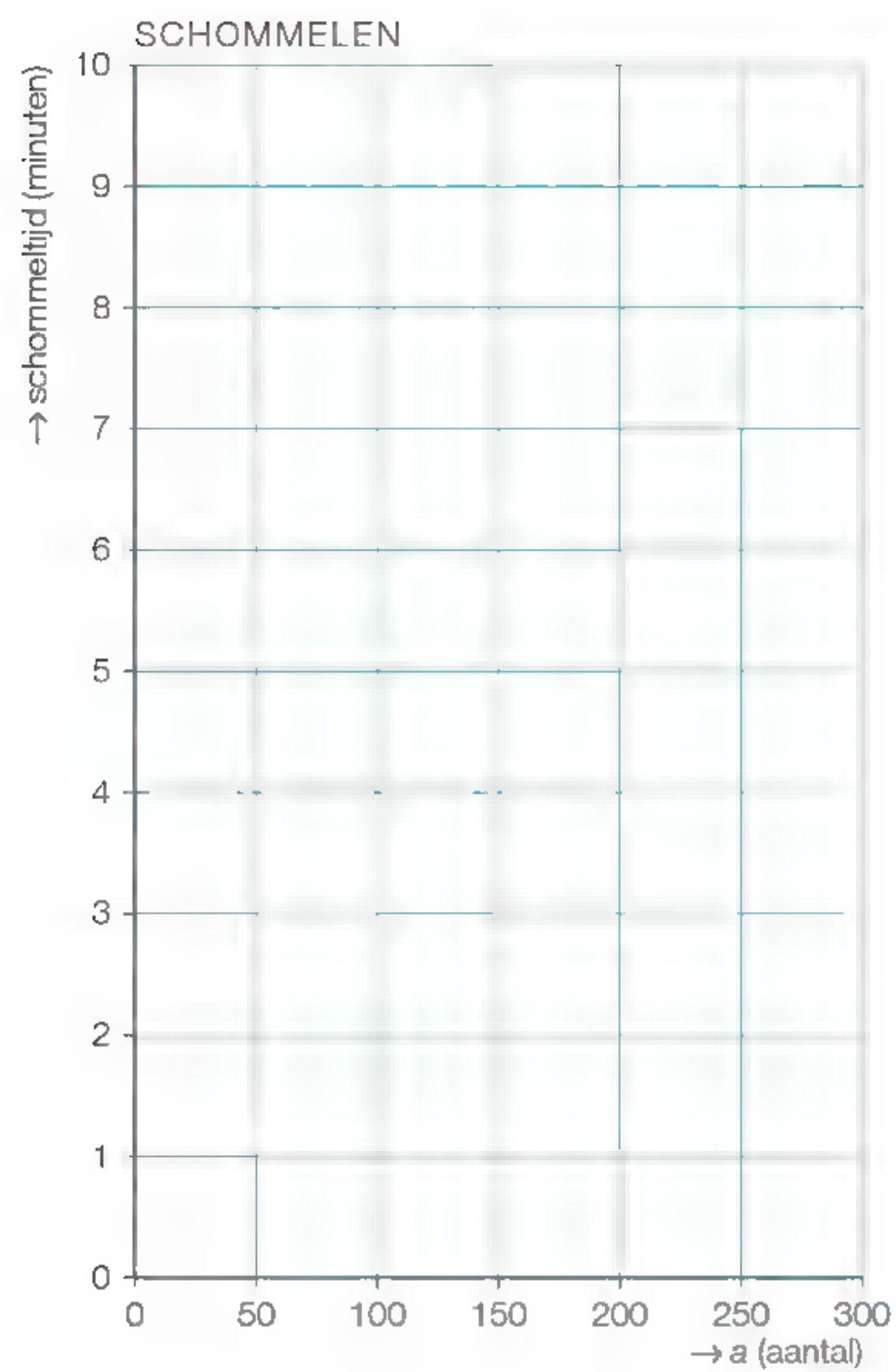




SCHOMMELEN

a (aantal)

schommeltijd (minuten)

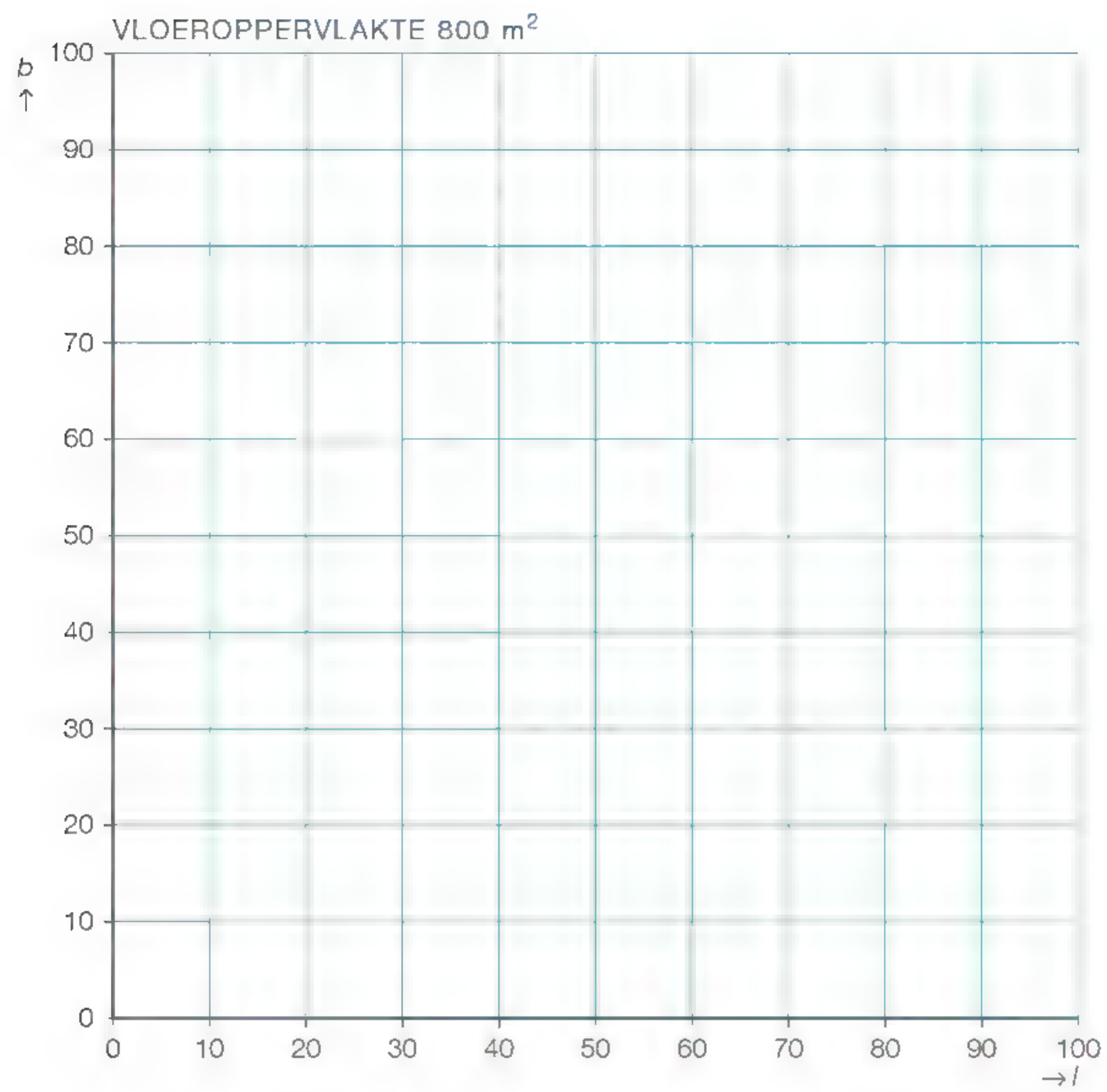




VLOEROPPERVLAKTE 800 M²

blz 179

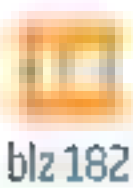
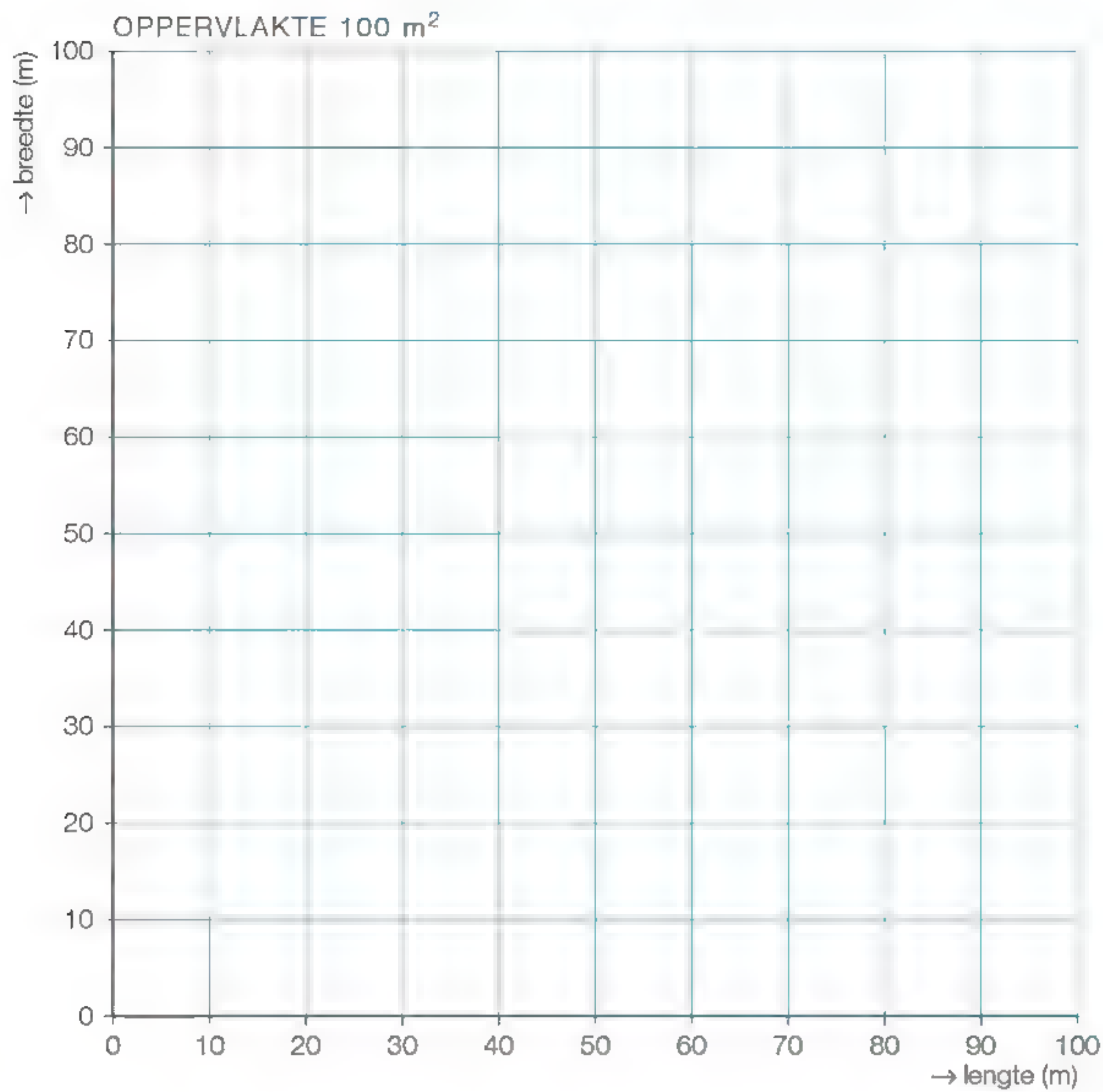
l	1	8	10	20	40	80	100
b							



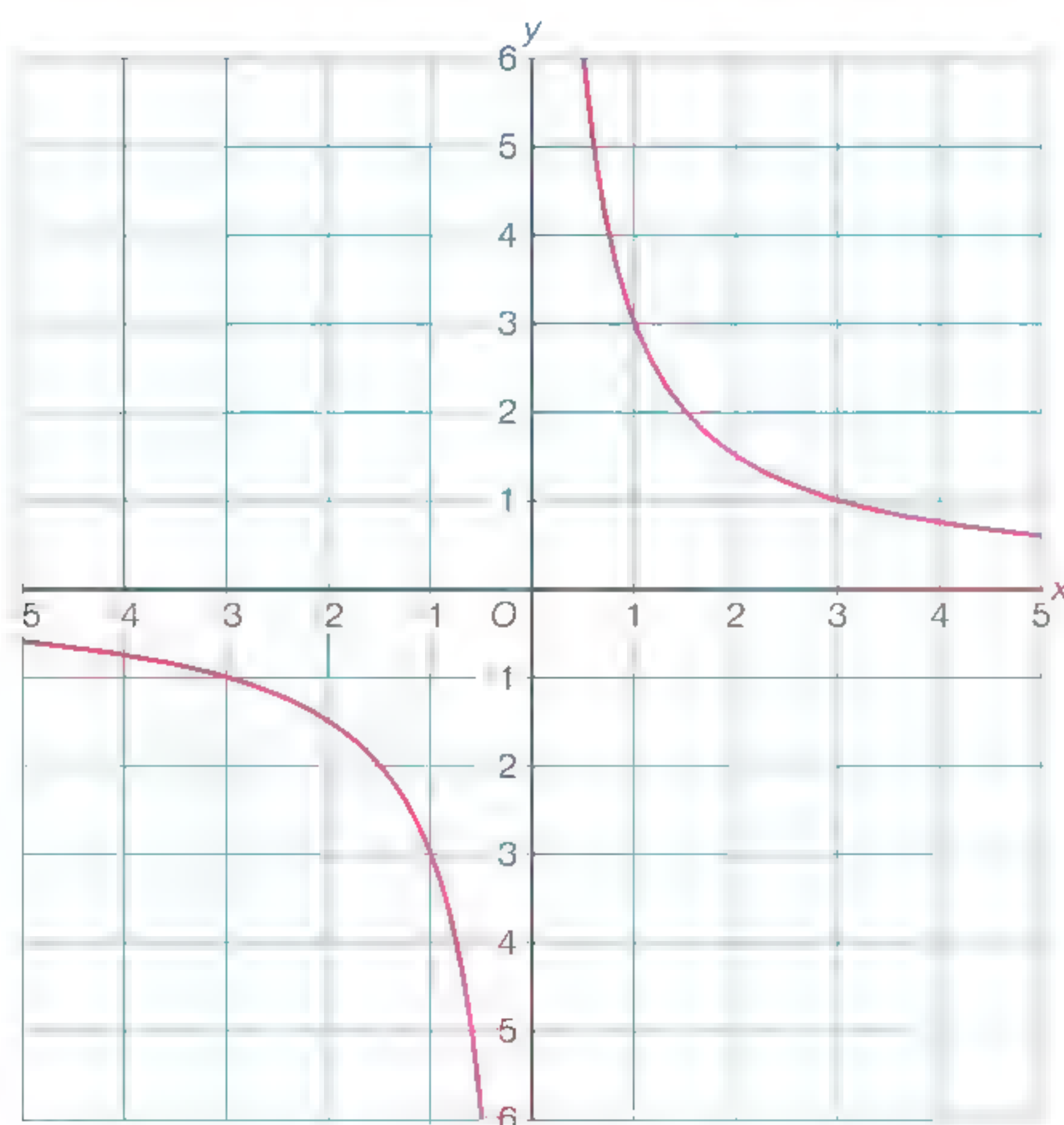


OPPERVLAKTE 100 m²

lengte (m)	1	2	4	5	8	10	12,5	20	25	50	100
breedte (m)											



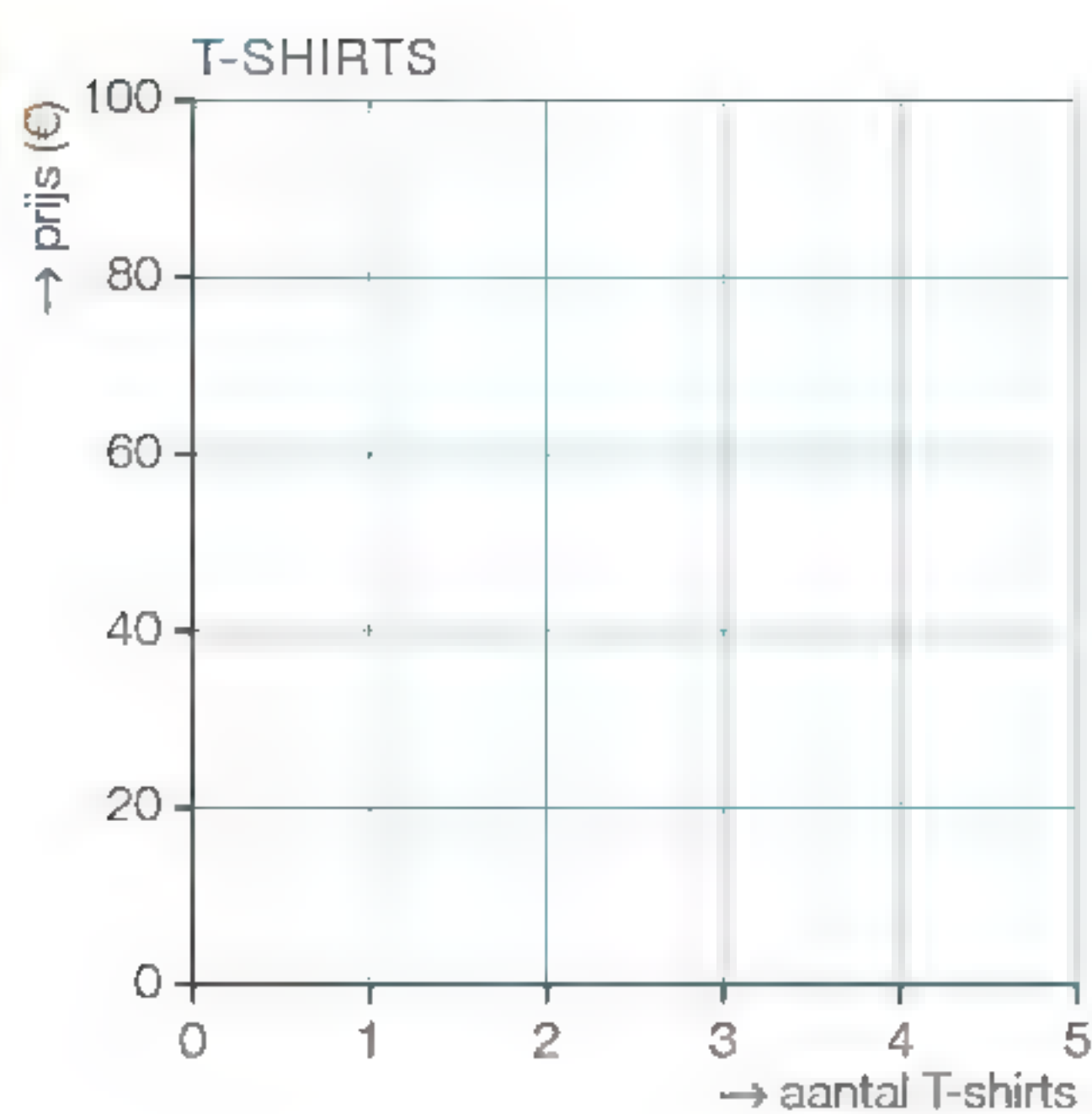
x	-5	-3	-1	-0,5	0,5	1	3	5
y								



4.2 Allerlei formules en grafieken

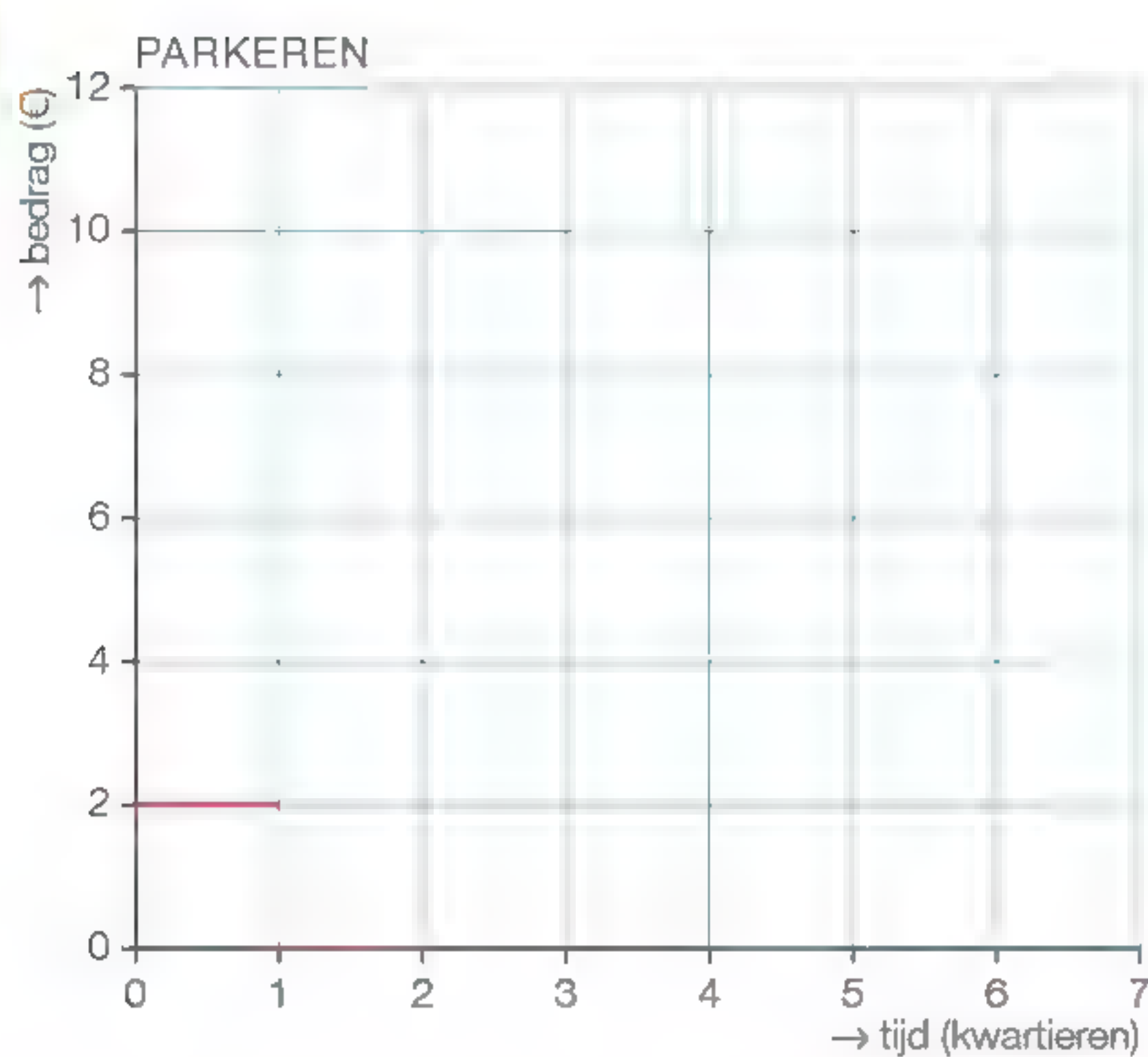
20

blz 186



25

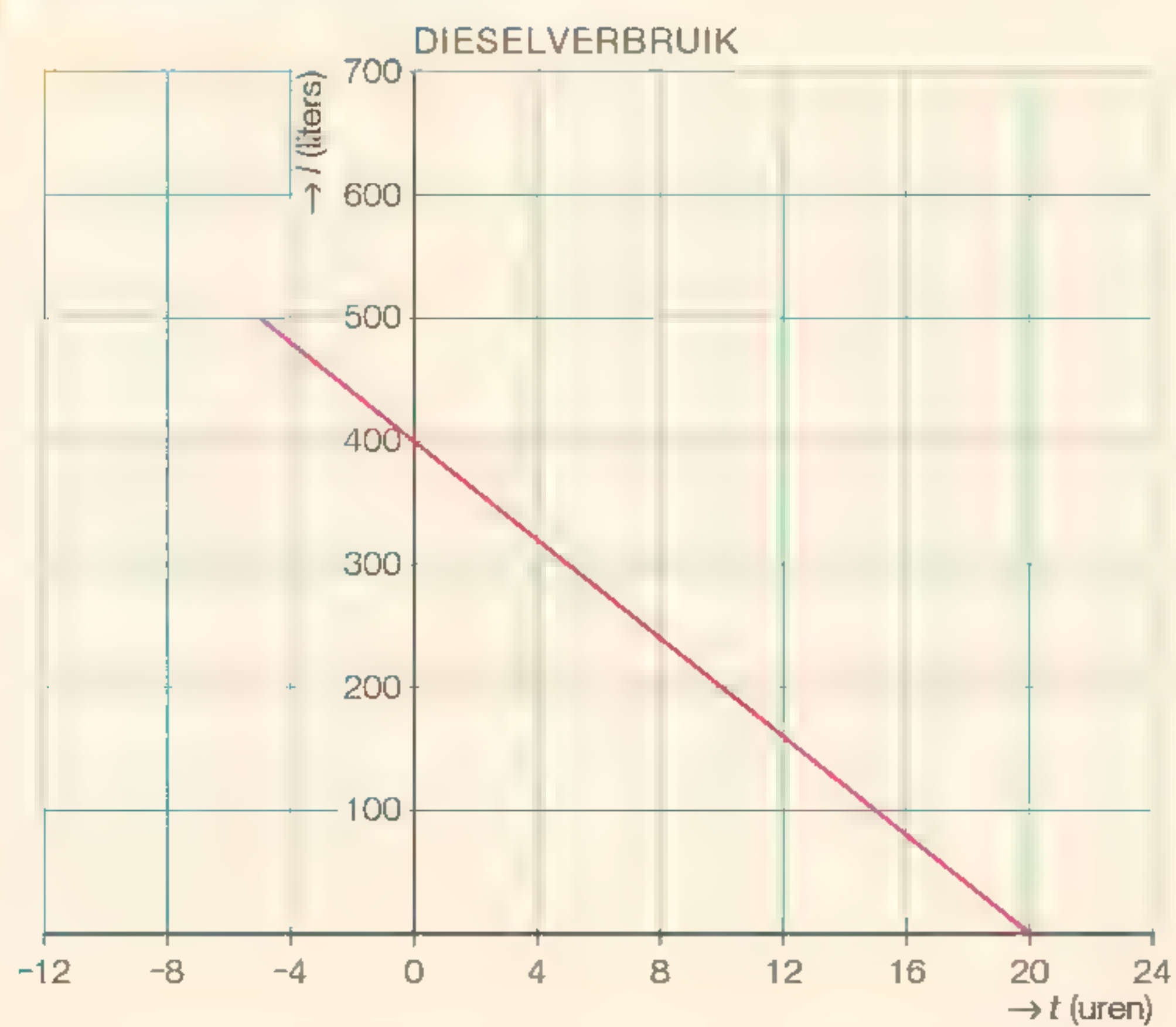
blz 191

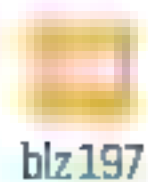


Test
opgave

blz 196

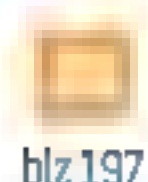
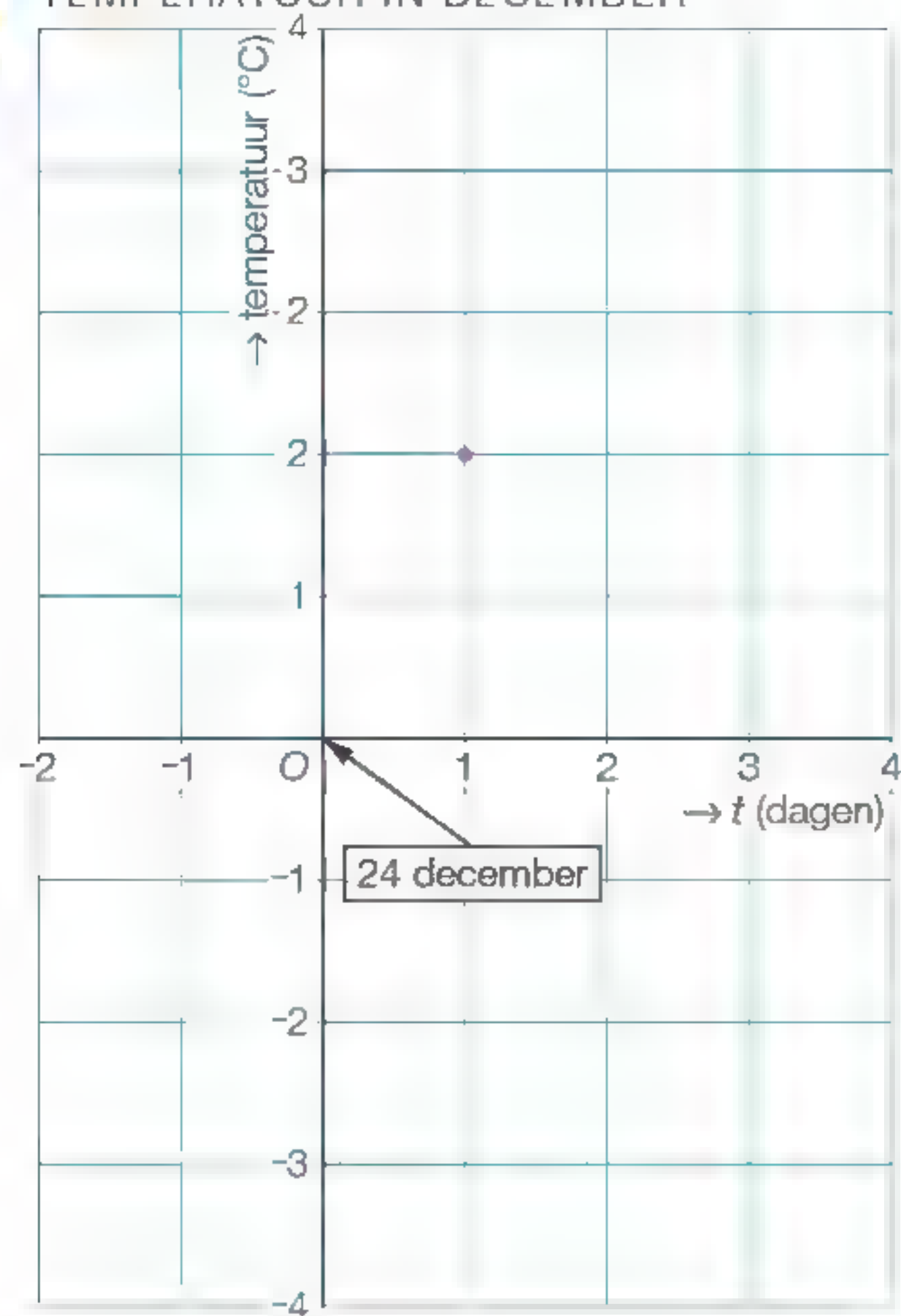
Dieselvebruik vrachtwagen





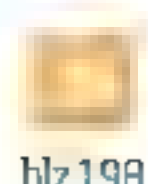
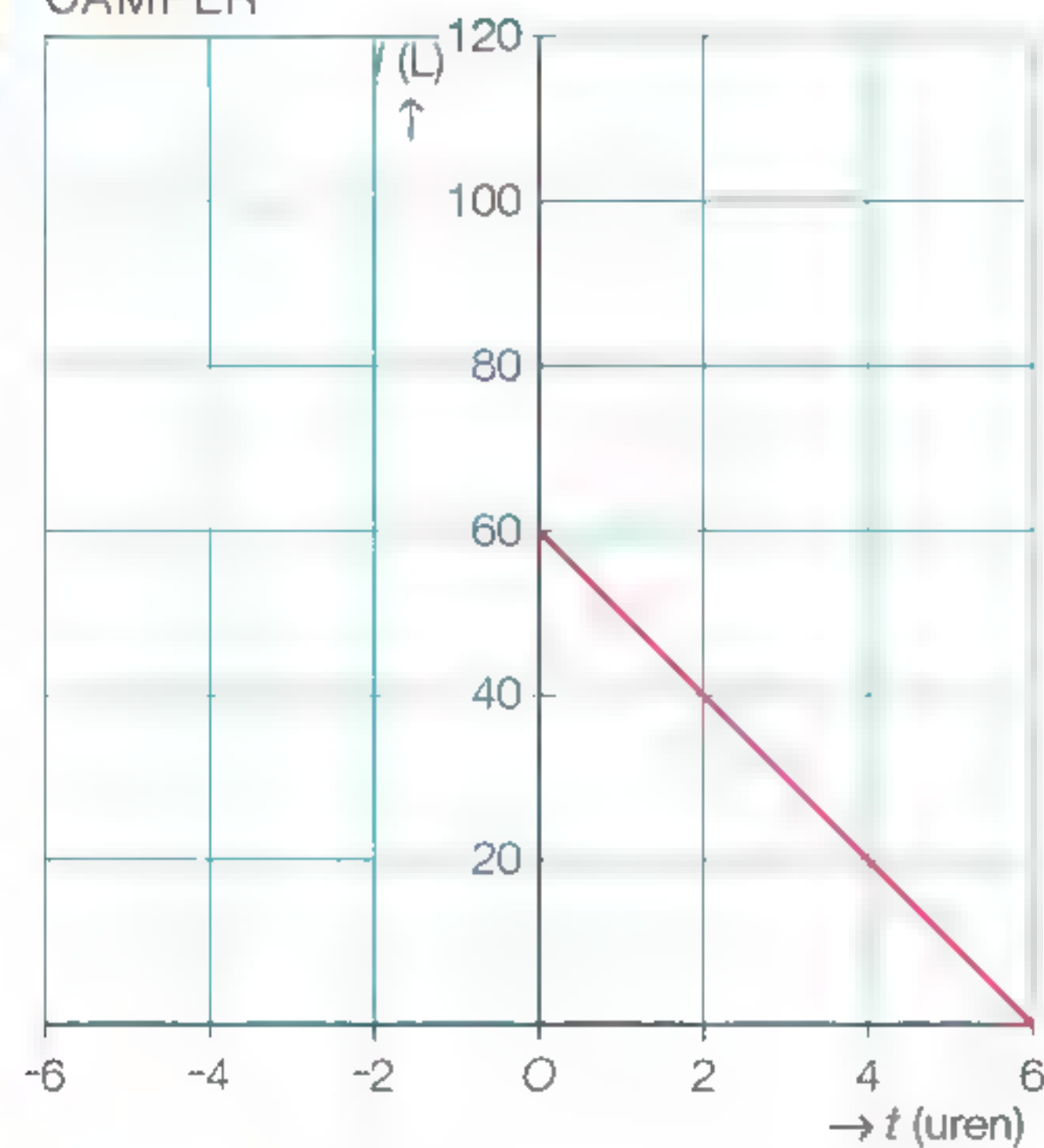
blz 197

TEMPERATUUR IN DECEMBER



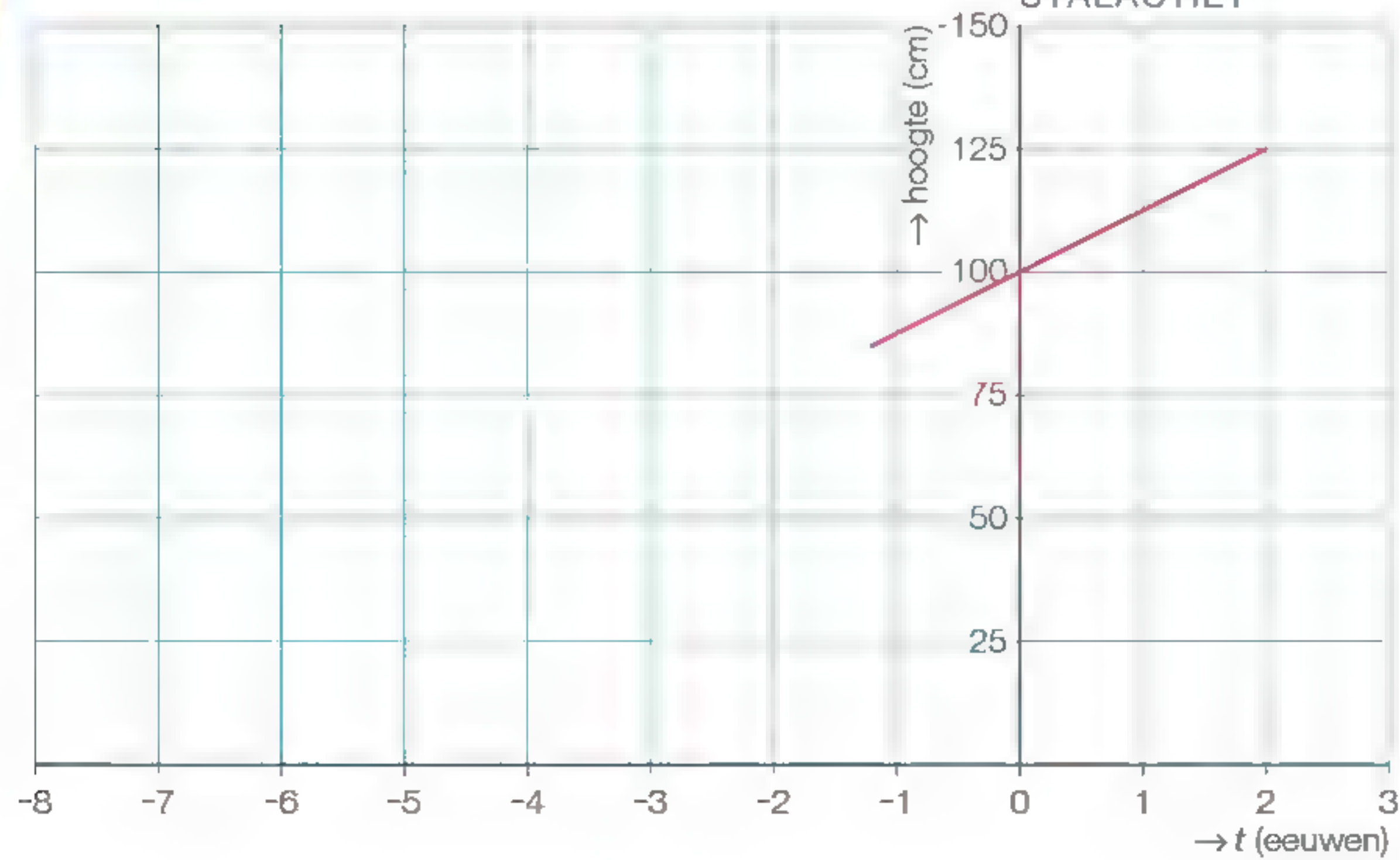
blz 197

CAMPER



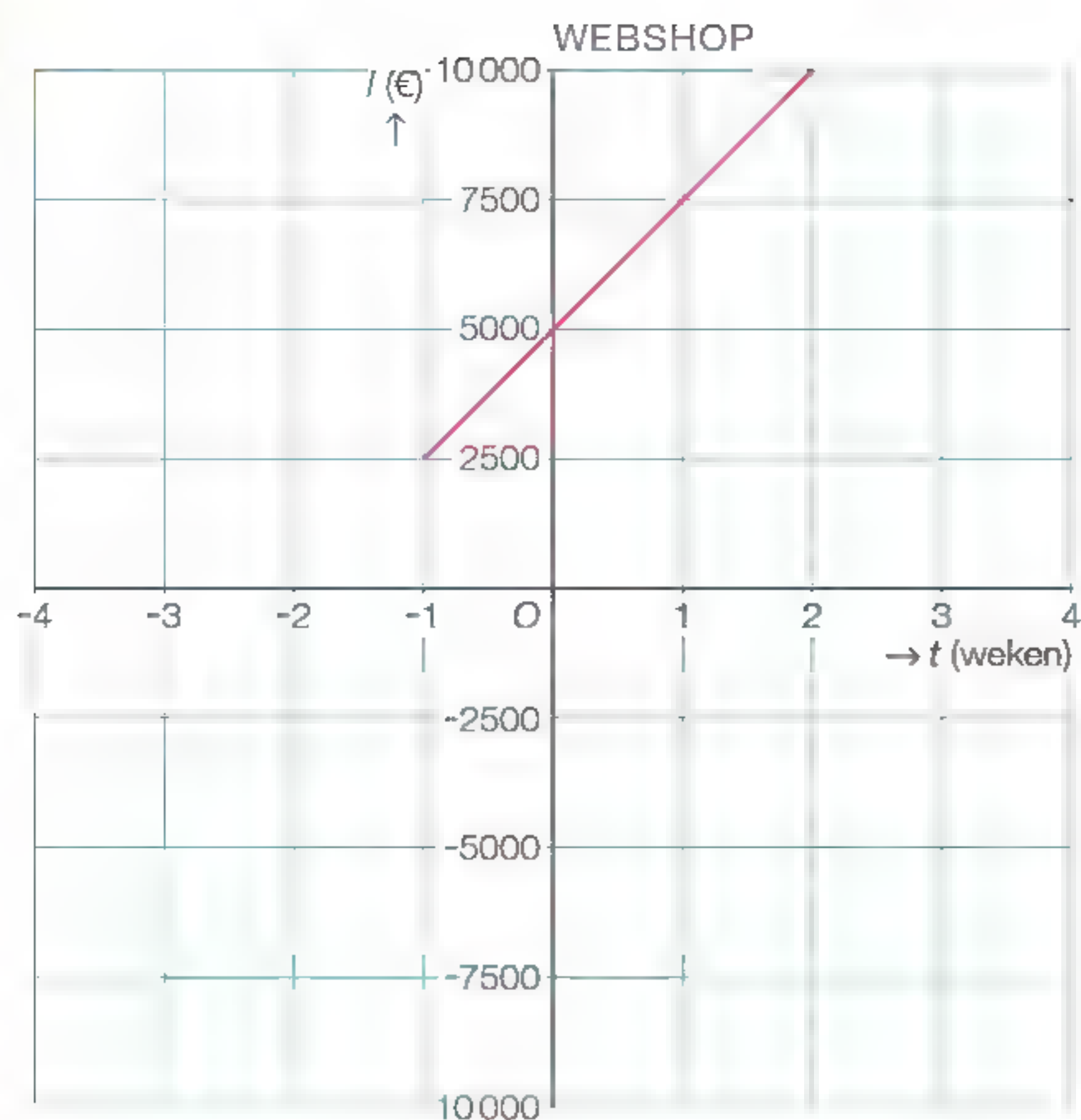
blz 198

STALACTIET



40

blz 199



4.3 Formules bij hetzelfde verband



blz 203

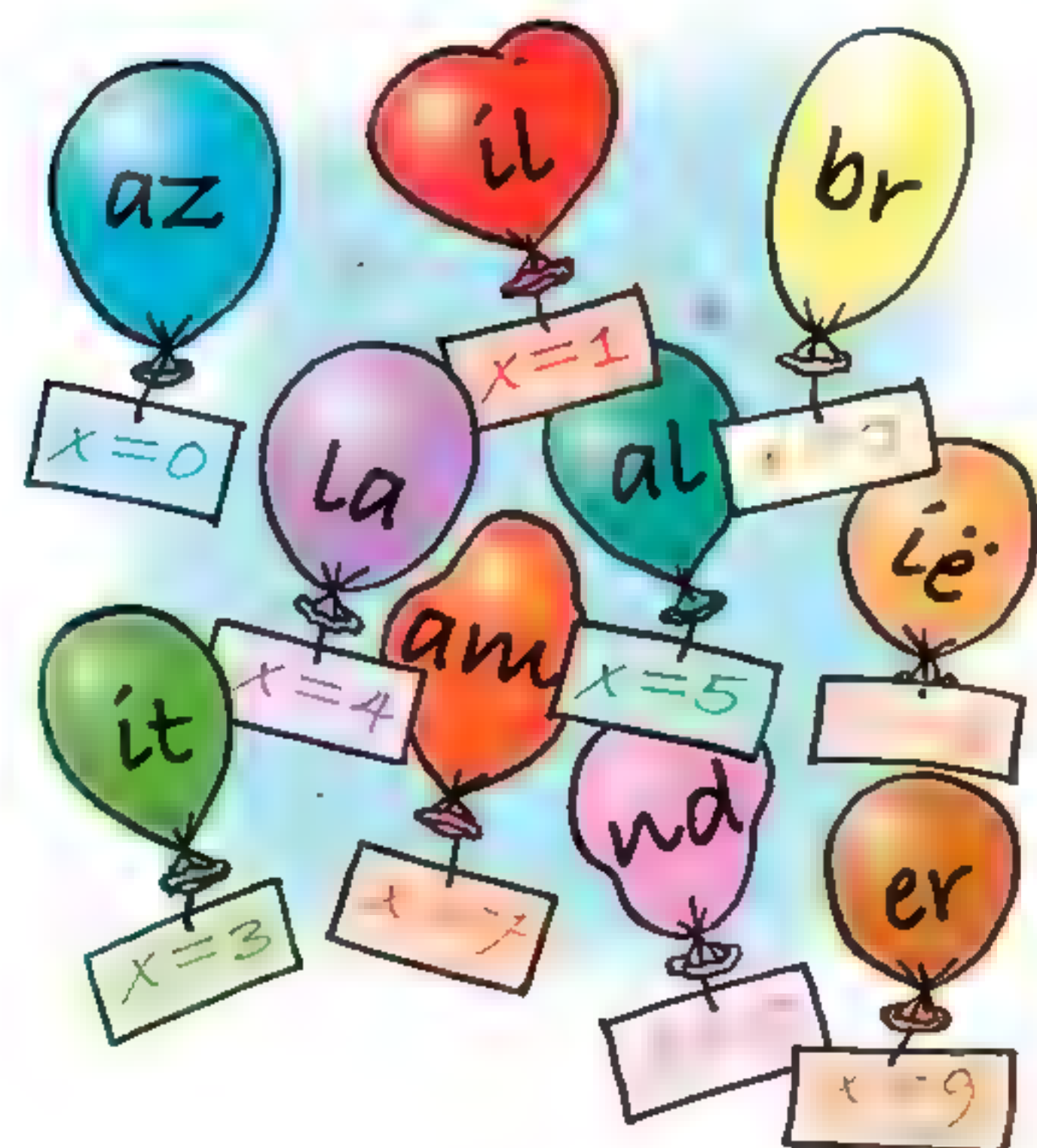
n	1	2	3	4	5	6	7	8	9	10
h (cm)										

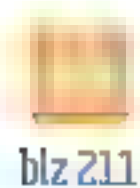
4.4 Vergelijkingen oplossen

52

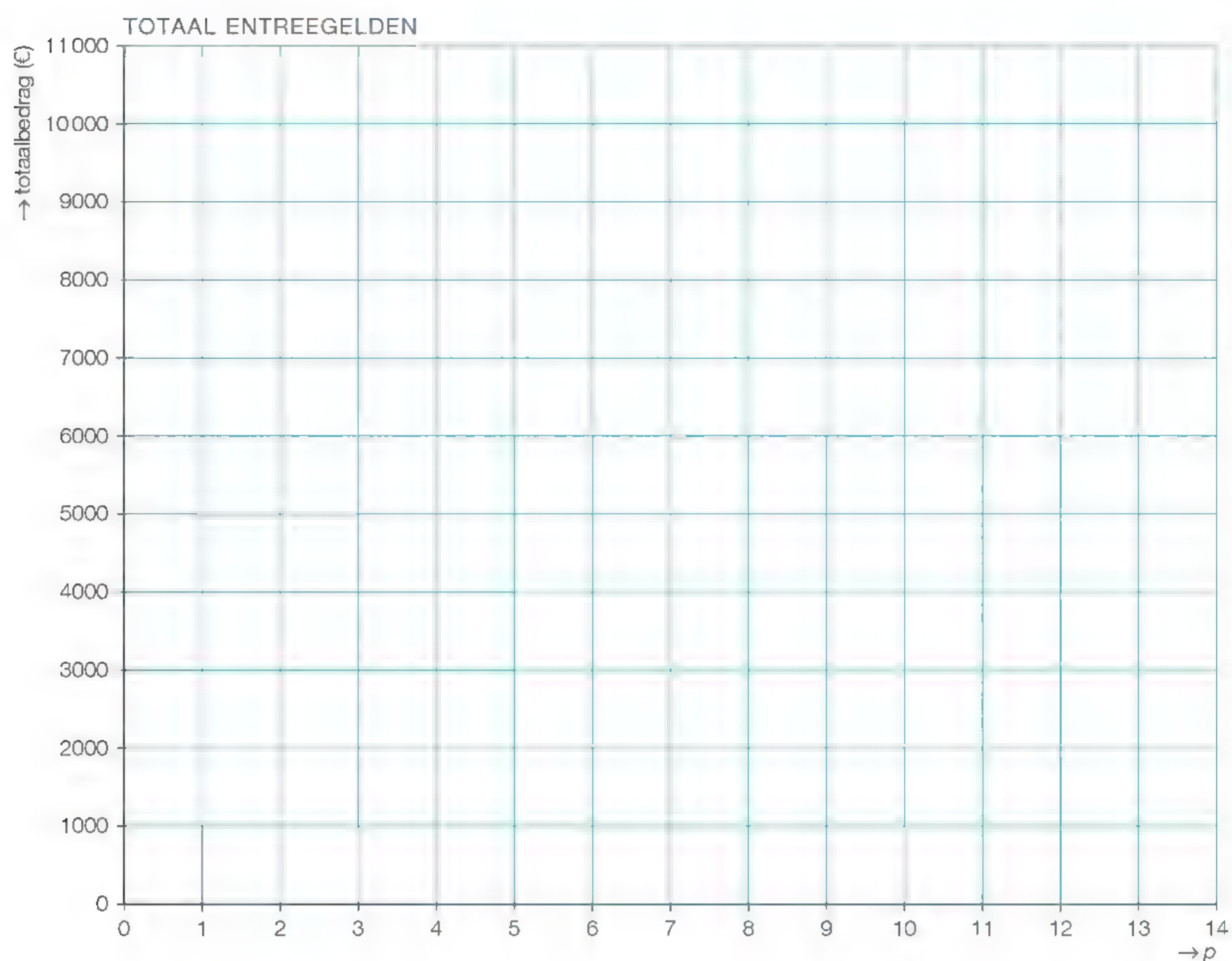
blz 210

vergelijking	oplossing	letters
$3x + 9 = 10x - 5$		
$12x + 6 = 6 + 9x$		
$3,5x + 16,5 = 28x - 8$		
$5x - 15 = 9 + x$		

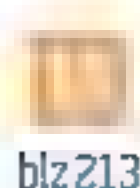




p	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
totaalbedrag (€)															

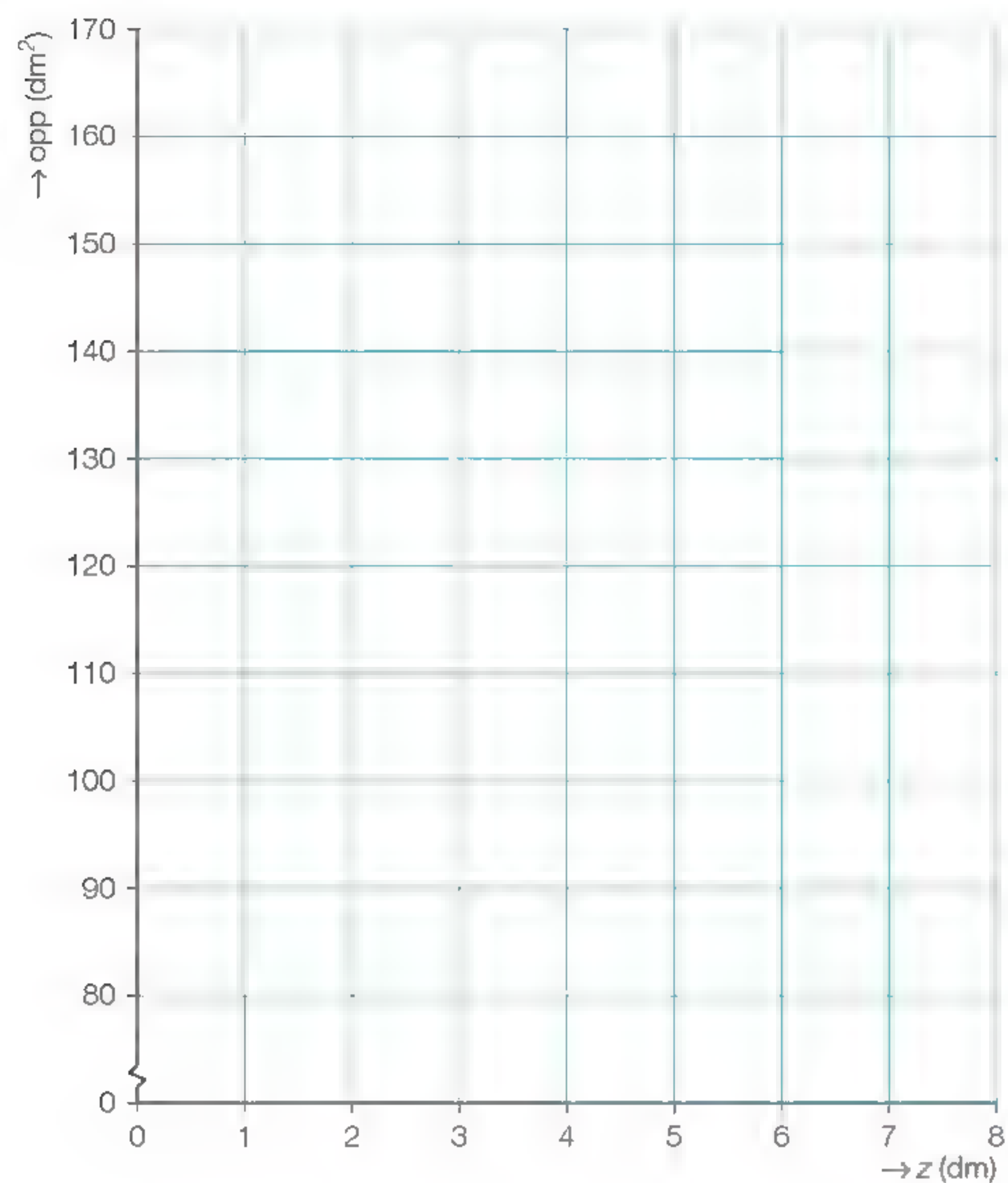


4.5 Trainen op examenniveau

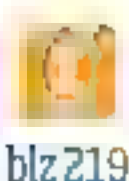


blz 213

z (dm)	0	1	2	3	4	5	6	7	8
opp (dm ²)									



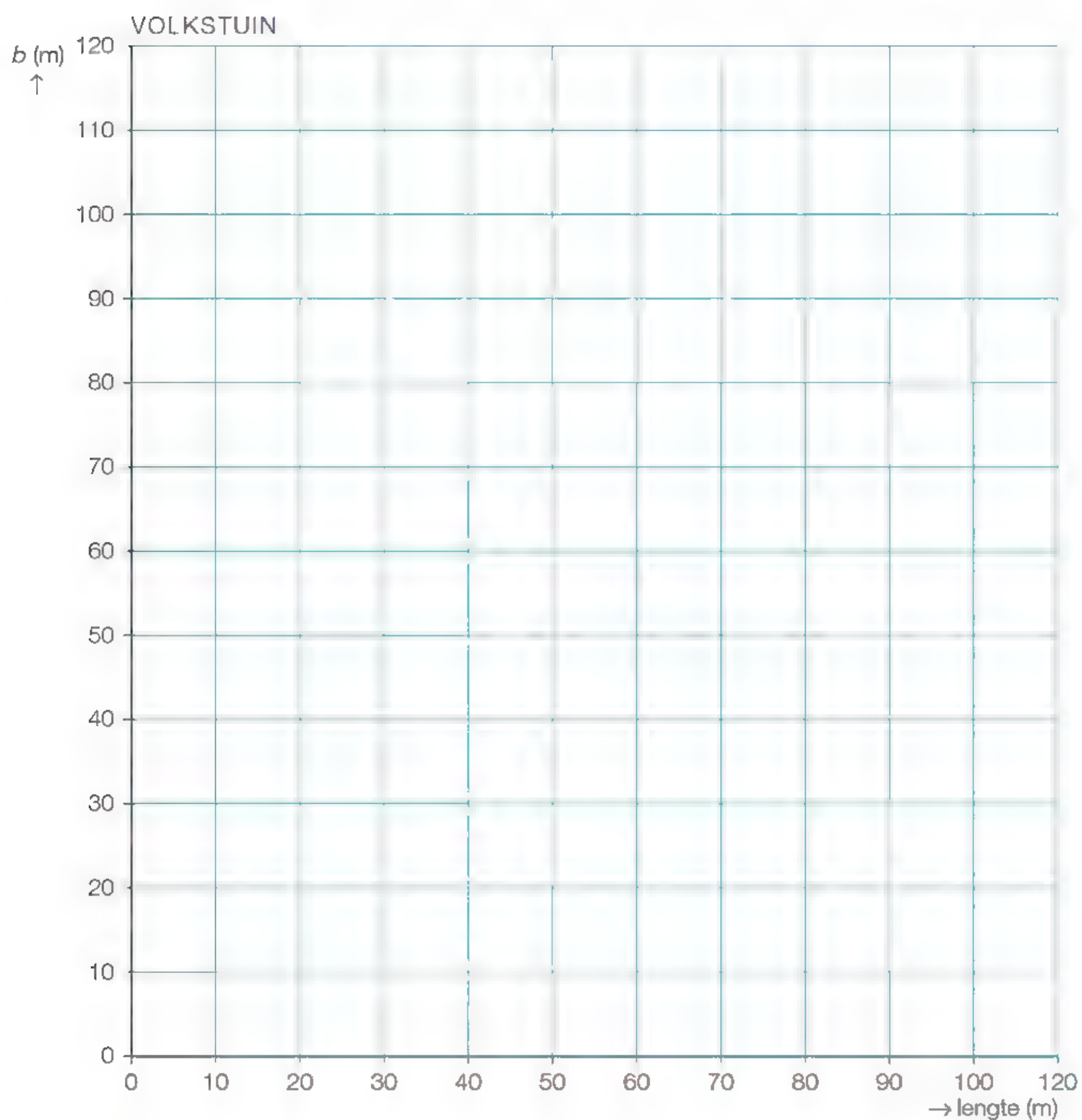
D-toets



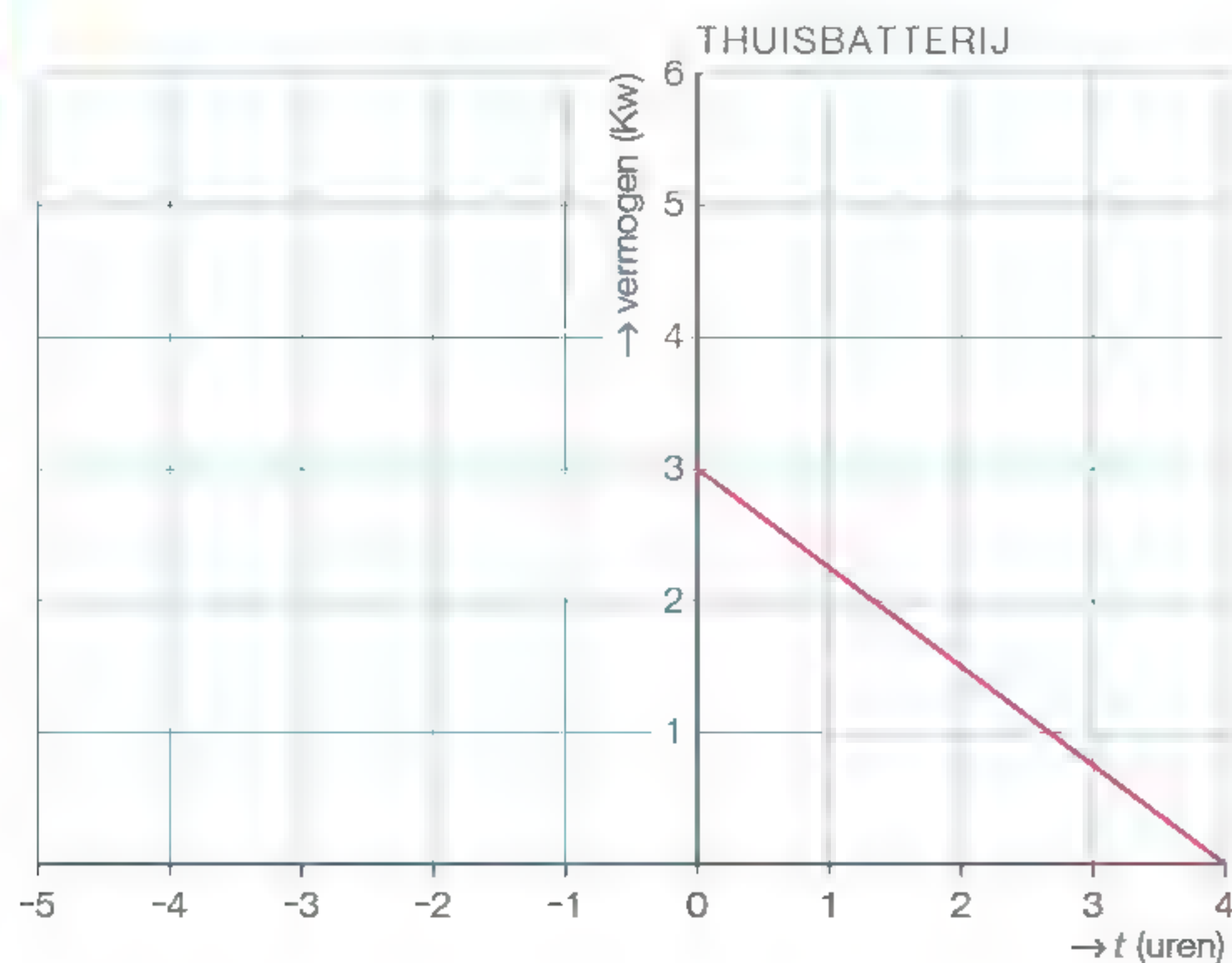
VOLKSTUIN

blz 219

lengte (m)	1	2	3	4	6	8	10	12	15	30	40	60	120
b (m)													



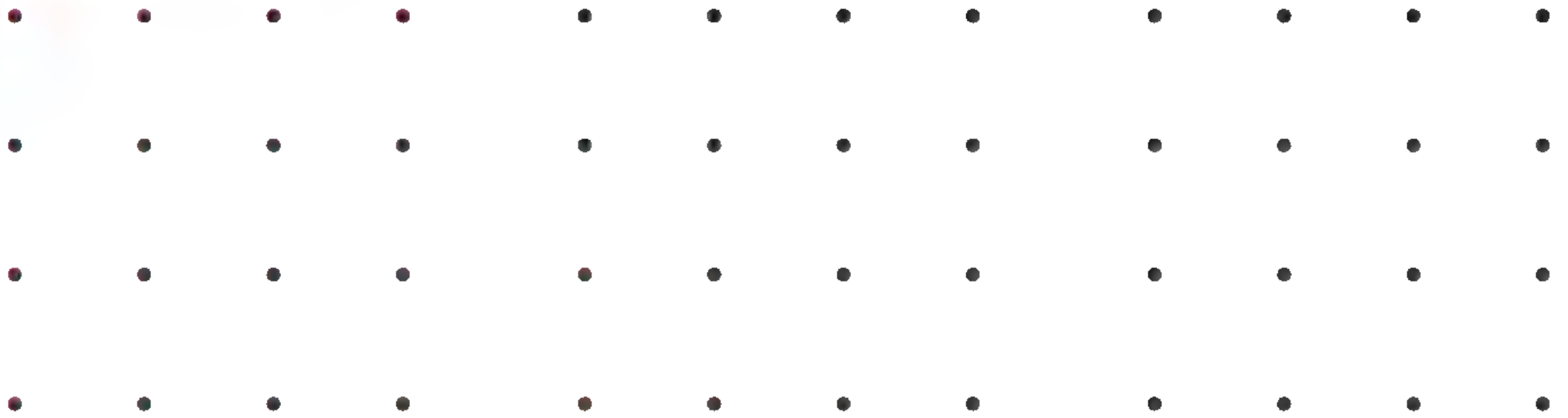
blz 221



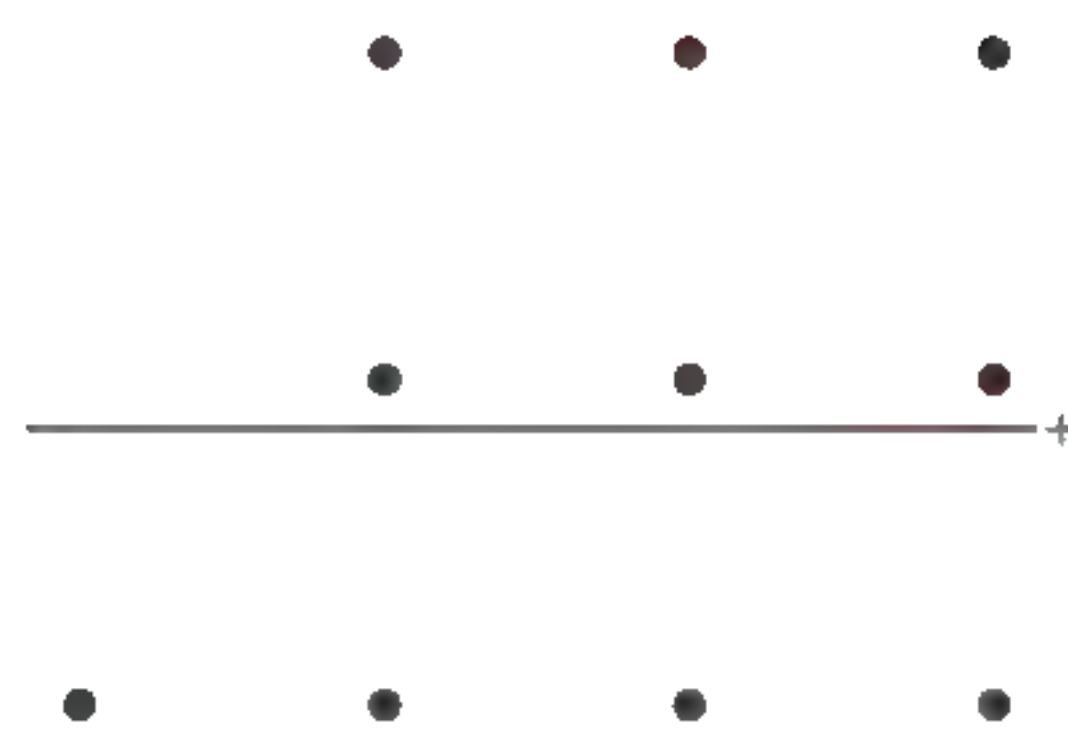
qWistig

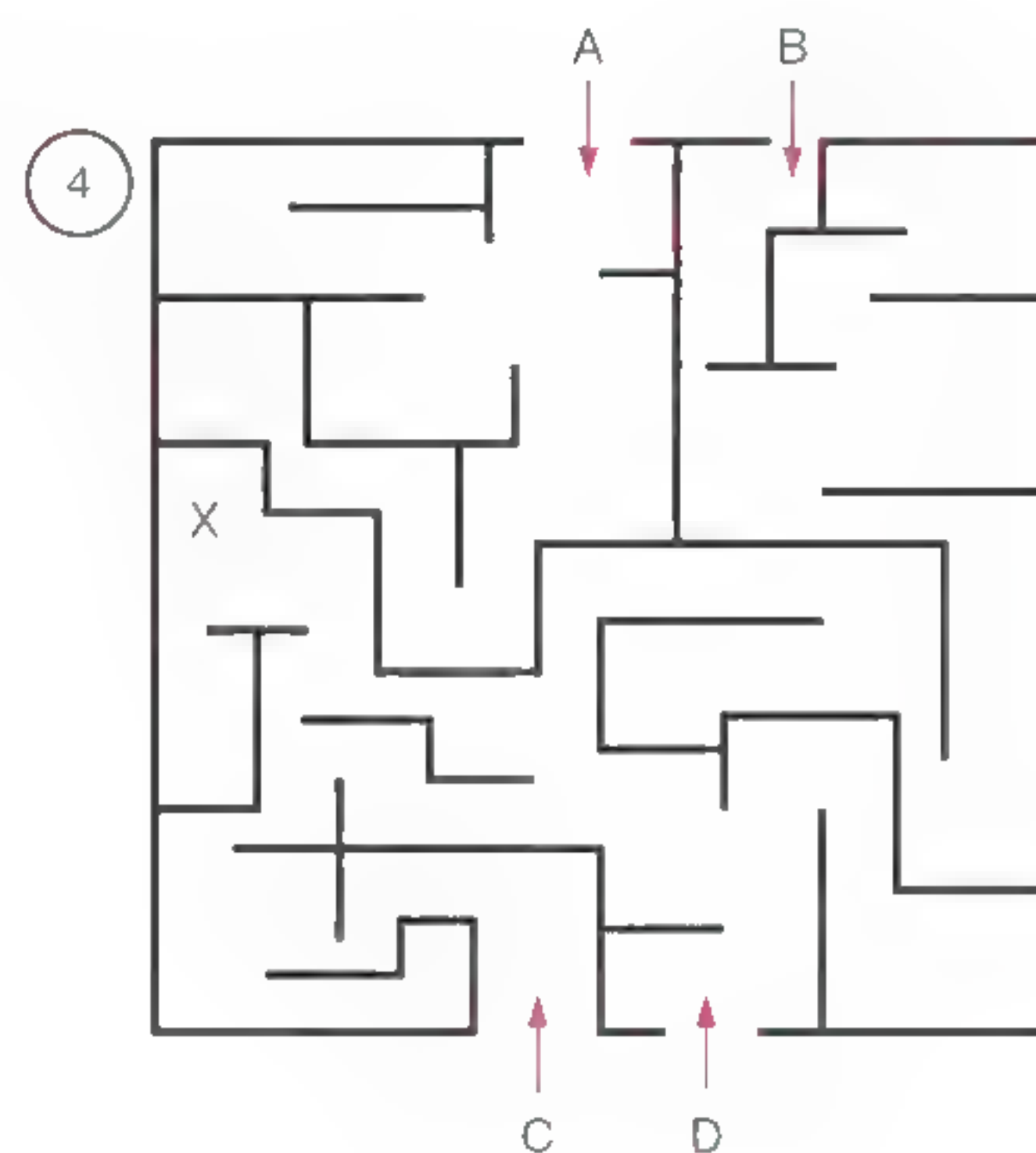
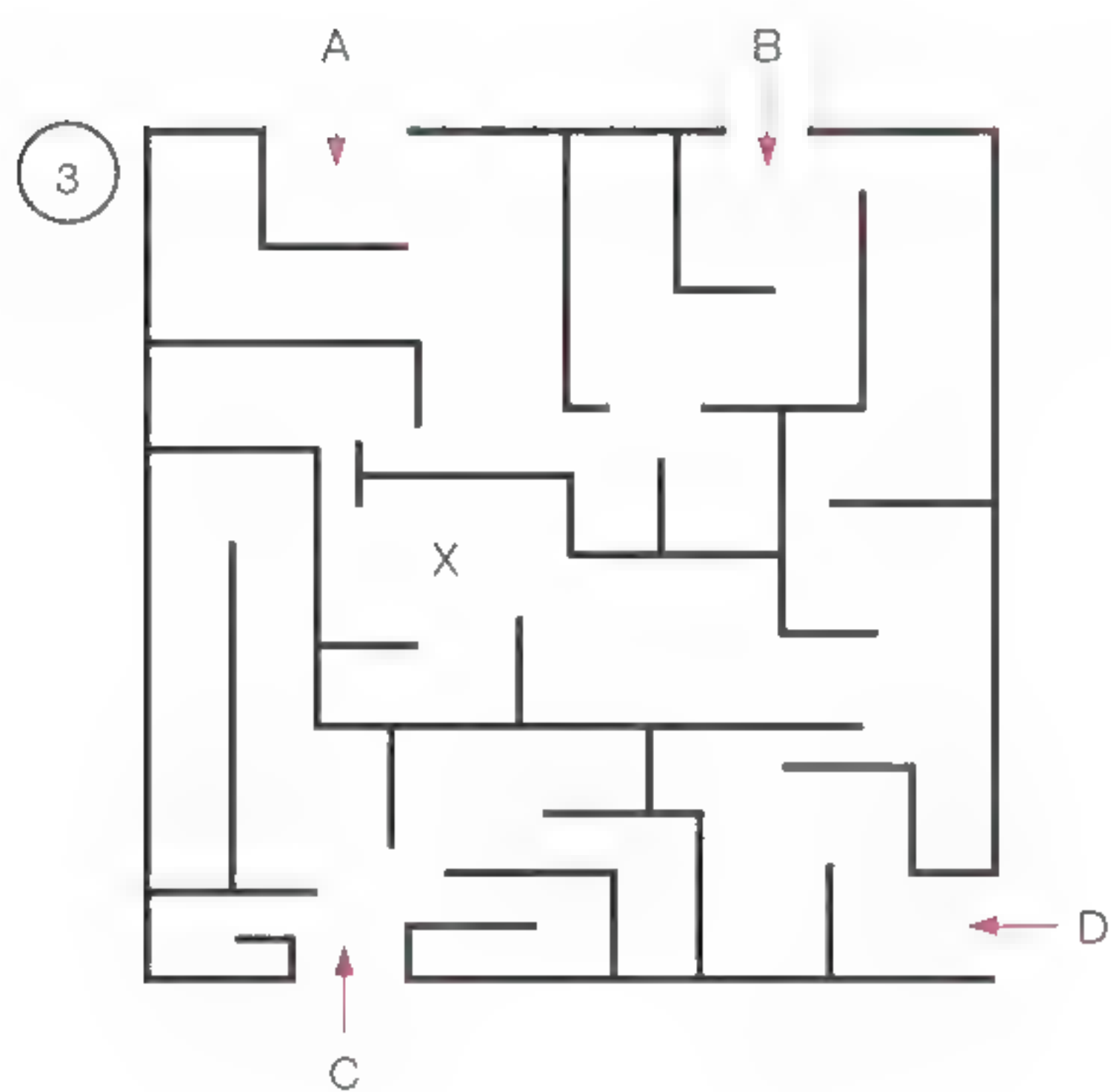
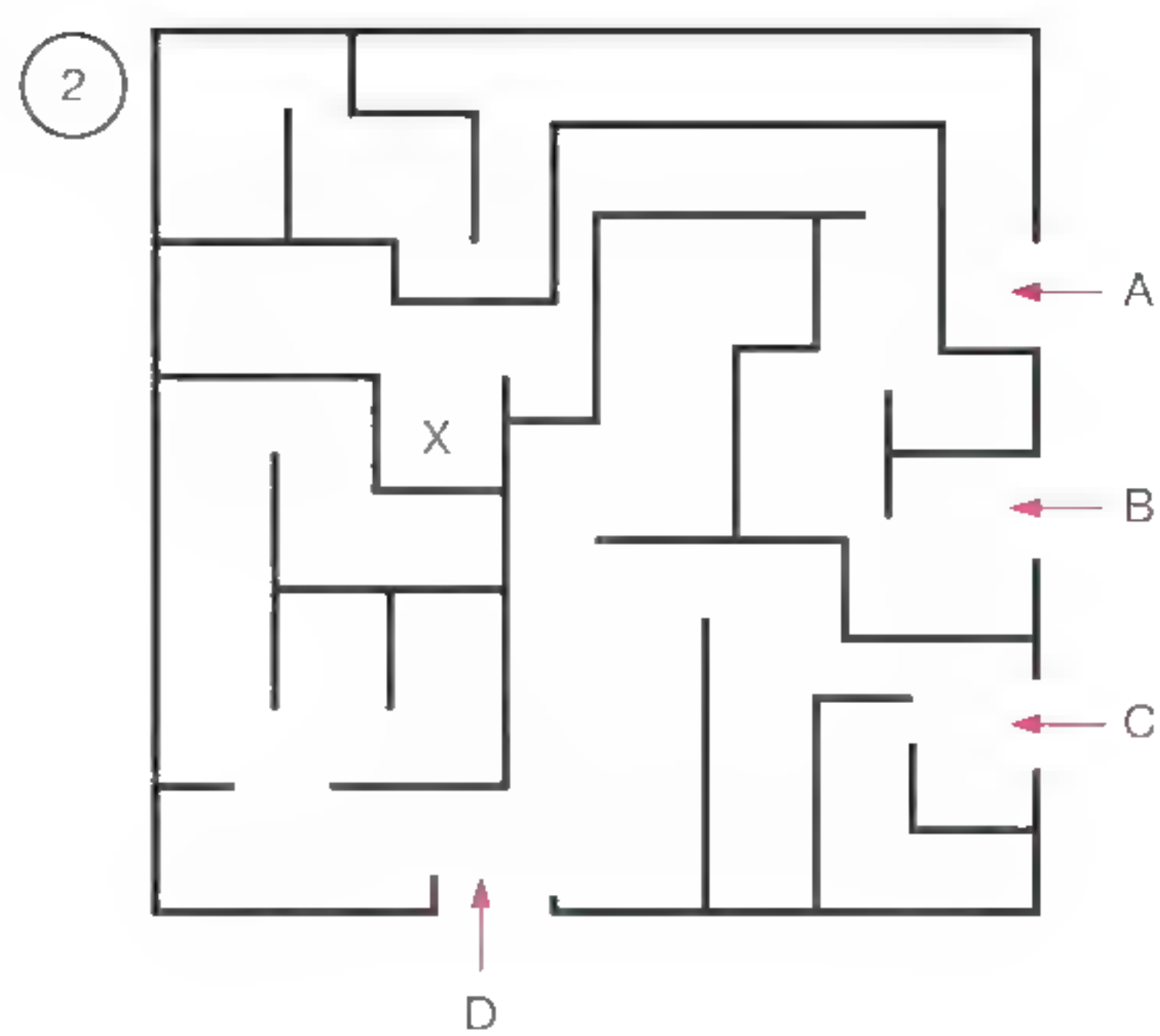
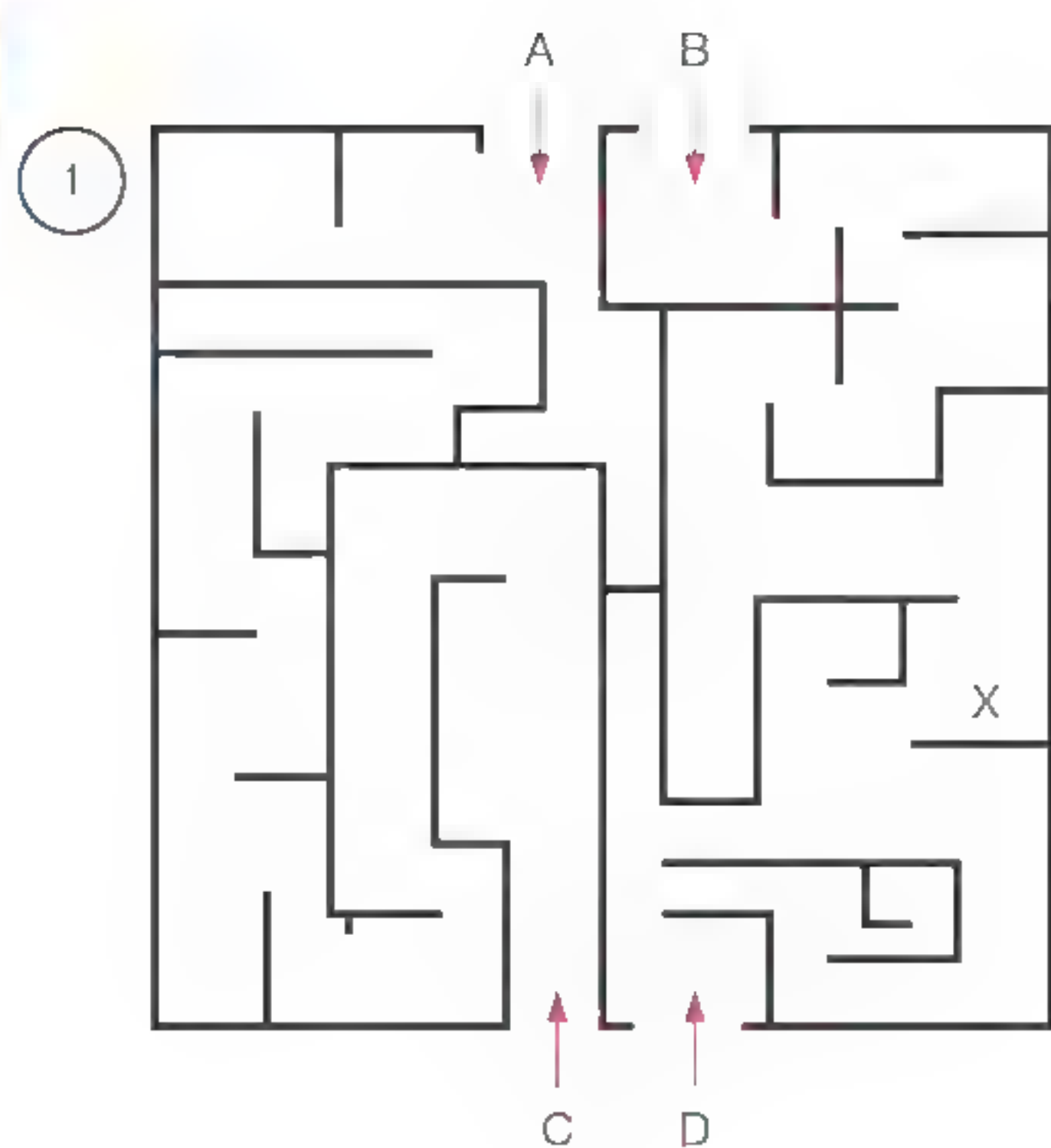


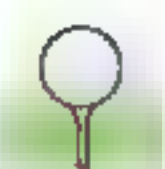
blz 259



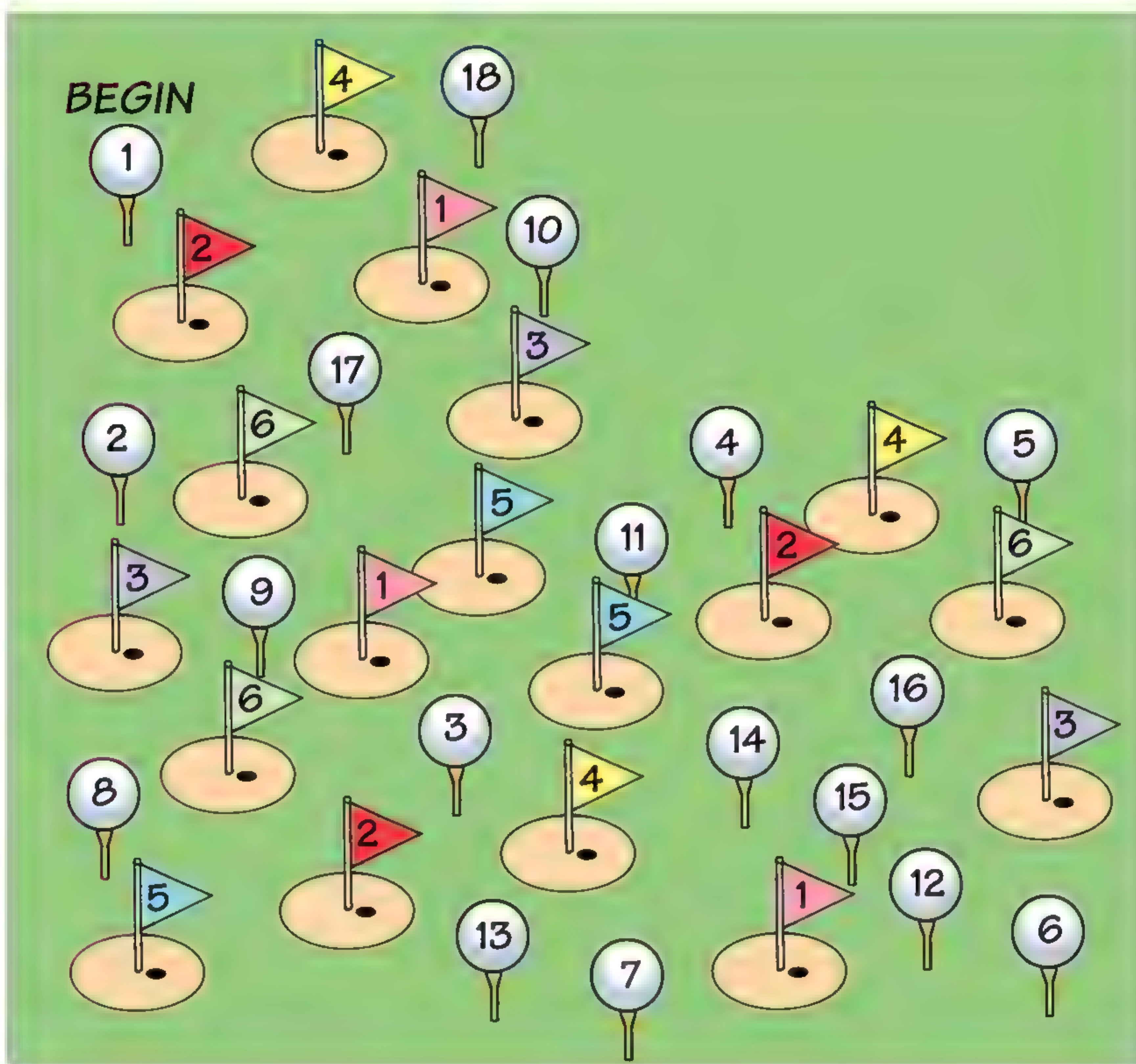
blz 260







	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	totaal
score speler 1																			
score speler 2																			





score spel 1	
speler 1	speler 2

score spel 2	
speler 1	speler 2

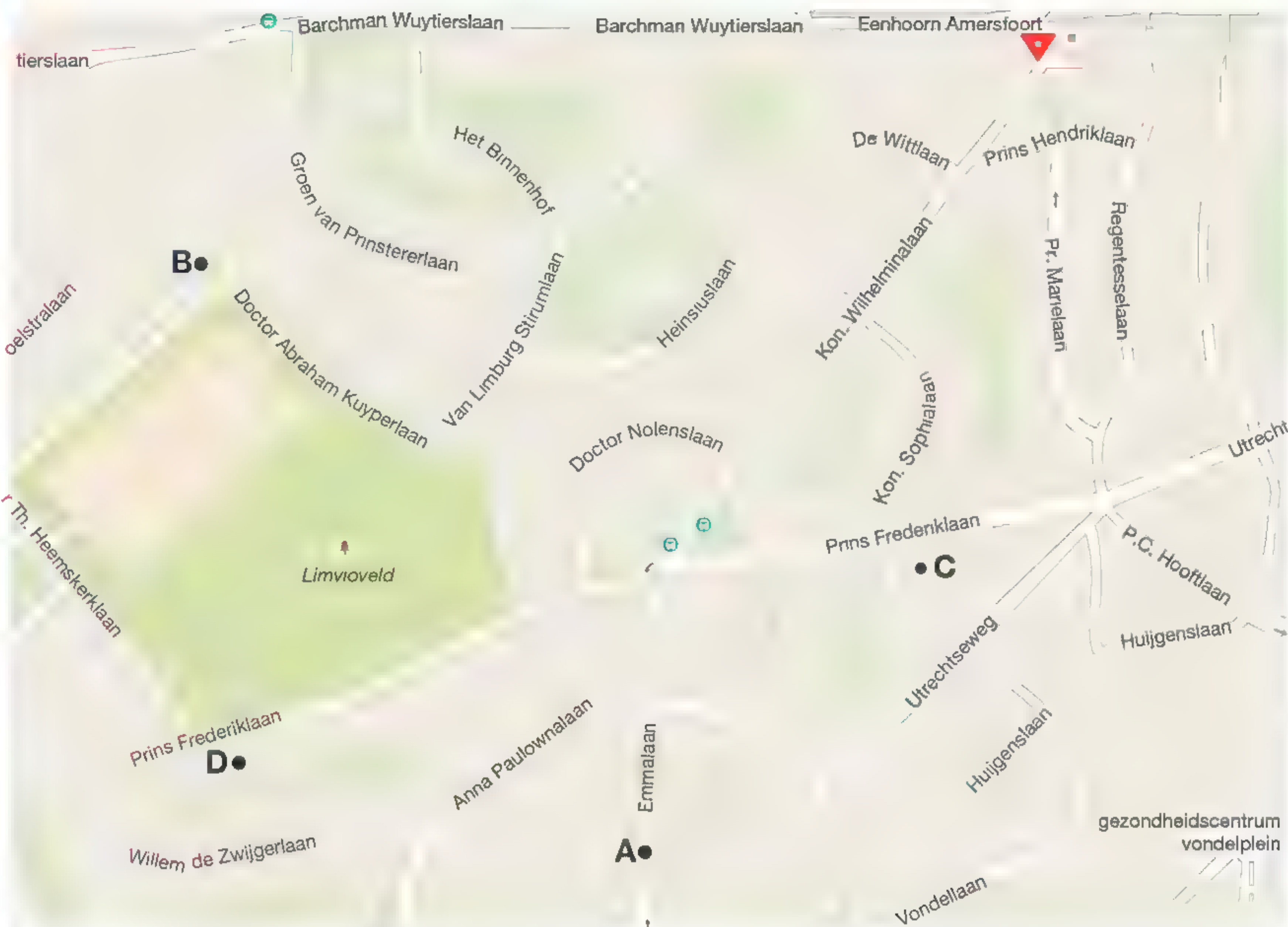
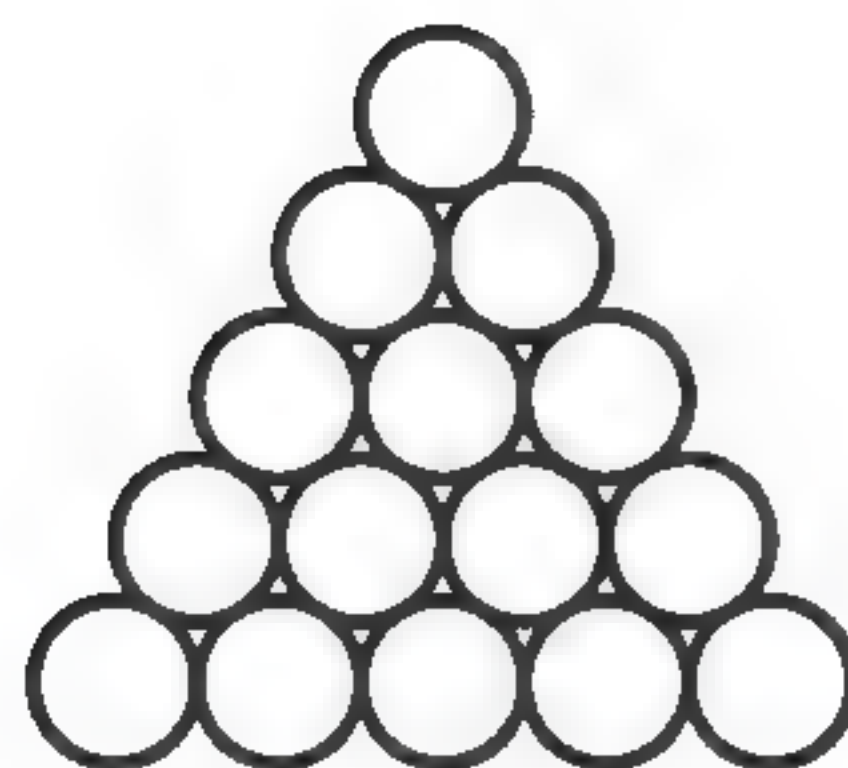
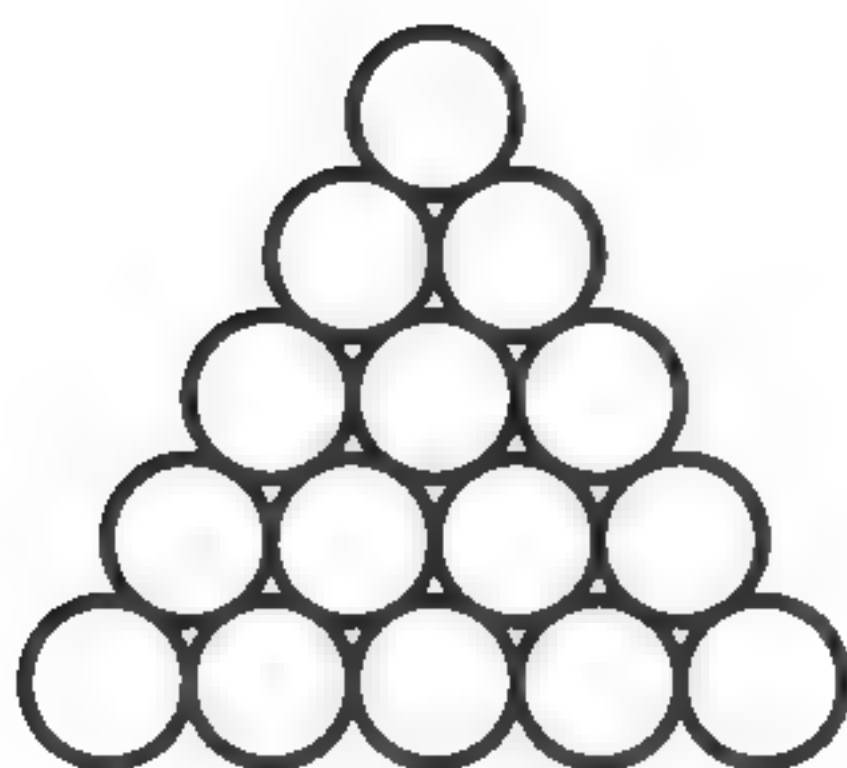
score spel 3	
speler 1	speler 2

score spel 4	
speler 1	speler 2

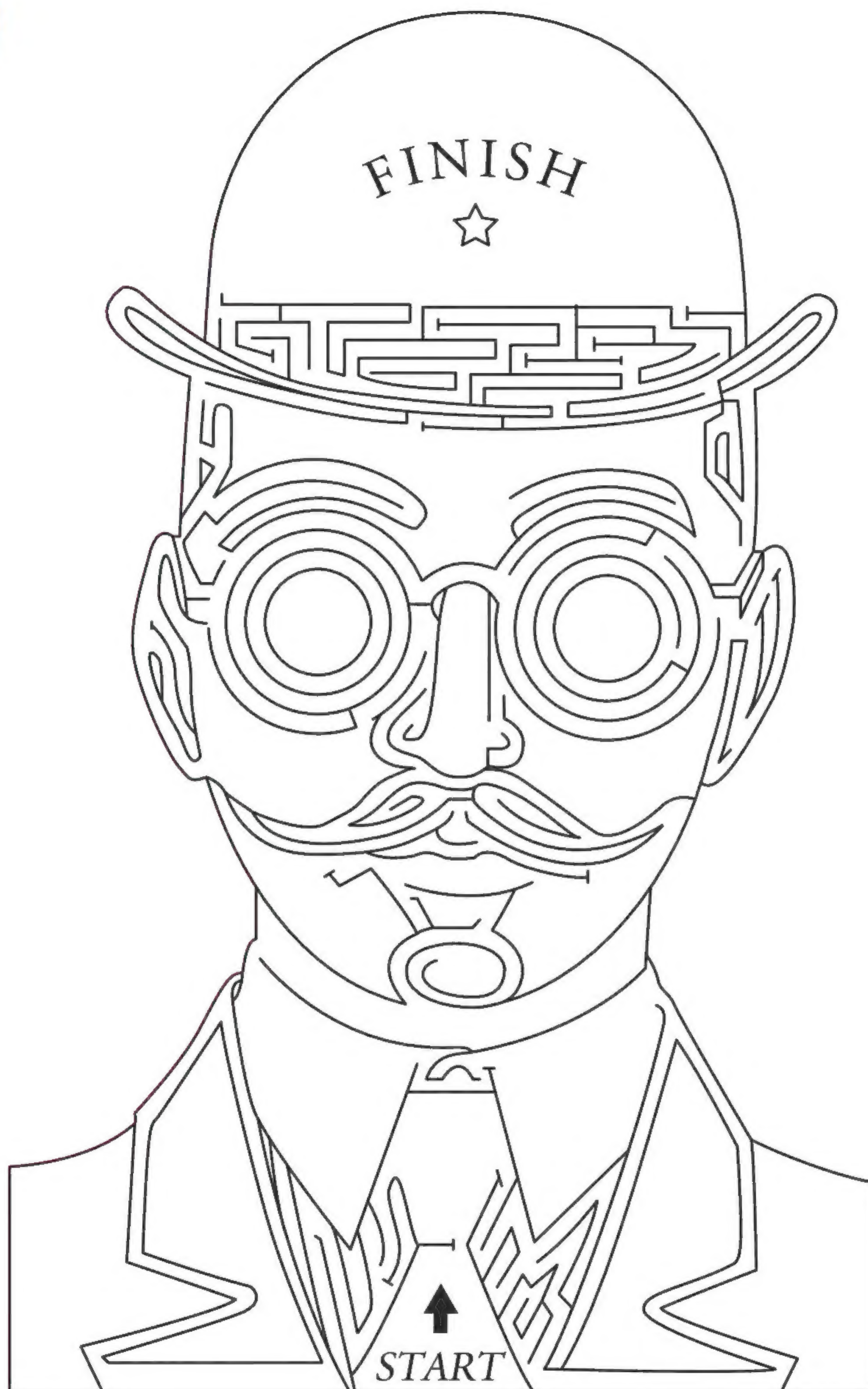
	1	2	7	1	9
9		7	3	9	1
1		3	2	8	2
2		7	1	7	3
1		9	7	2	8

A 6x6 grid of dots with numbers placed between them. The numbers are: Row 1: 8, 2, 3, 8, 2; Row 2: 2, 3, 2, 7, 3; Row 3: 1, 7, 3, 2, 9; Row 4: 3, 2, 1, 1, 2; Row 5: 6, 2, 4, 2, 1. The bottom row of dots is empty.

8	4	1	2	2
5	1	3	1	6
1	5	3	5	1
1	2	4	1	3
5	2	9	5	7







Verantwoording

Beeld

Illustraties: Richard van de Pol, Tilburg; Haasart, Wim de Haas, Rhenen

Technisch tekenwerk: Integra Software Services

Beeldresearch: B en U International Picture Service, Amsterdam

Cartografie: Van Oort redactie en kartografie, Almere

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